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ABSTRACT

This report, developed over a 17 calendar-day period, was prepared to quantitatively present the status of vocational education for use in identifying major issues and problems, and in indicating implications for the future. Findings and recommendations are to be used as a background for considering alternative policy decisions regarding vocational education, and are presented for each of seven major sections: (1) main elements of the vocational education system, (2) major institutions, outside the public school system, that provide vocational education, (3) the public school vocational program, (4) factors influencing vocational education, (5) vocational education objectives, (6) comparison of vocational education with manpower programs in a cost-effectiveness framework, and (7) the role and impact of federal funding. The supporting appendixes are available as VT 013 229. (GEB)

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Volume I of II

Report of the Analysis Group HEW Vocational Education Review Task Force

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Prepared for

Dr. James Abert
Deputy Assistant Secretary
Evaluation and Monitoring
Department of Health, Education, and Welfare
Washington, D. C. 20201

Operations Research, Inc.
1400 Spring Street
Silver Spring, Md. 20910

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This report is the product of an "Analysis Group" effort. The major members of this group are listed below.

Dr. W.J. Leininger	Operations Research, Inc., Chairman
Prof. E. Stromsdorfer	Indiana University
Prof. A. Corazzini	Tufts University
Prof. R. Young	Ohio State University
Prof. L. Houstoun	Princeton University
Mr. P. Carpenter	Consultant
Dr. R. Sachs	Consultant
Mr. P. Don Vito	Consultant
Mr. D. Bourland	Consultant
Mr. S. Eastman	Consultant

Others who were not full-time members of the group, but made major contributions, were Dr. D. O'Neill, CNA; Dr. A. Pascal, RAND; Mrs. D. Bourland, Consultant; Dr. L. Llewellyn and Messrs. M. Brown and T. Callahan, Operations Research, Inc.

Main responsibility for various sections of the report breaks out approximately as shown below.

Section II	D. Bourland and S. Eastman
Section III	S.Eastman and D. O'Neill
Section IV	D. Bourland and T. Callahan
Section V	L. Houstoun

Section VI	R. Young and P. Carpenter
Section VII	E. Stromsdorfer
Section VIII	A. Corazzini and R. Sachs
Appendix A	S. Eastman and R. Sachs
Appendix B	P. Don Vito
Appendix C	M. Brown and L. Llewellyn
Appendix D	A. Pascal
Appendix E	E. Stromsdorfer

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I. INTRODUCTION

PURPOSE

The purpose of the effort is to quantitatively delineate the present status of vocational education in a way that highlights the current major issues and problems. Policy and budgetary option points in the structure are made explicit. The information contained in this report is necessarily incomplete because of the large size and range of vocational education programs, and the time available.

This quantitative description of vocational education drawn from existing data and analyses was used as a "sounding board" for assessing the alternative vocational education packages prepared by the "Working Group" and other interested officials. It is clearly <u>not</u> the purpose of this effort to develop or recommend alternative policies or objectives.

BACKGROUND

This effort was undertaken in response to a request from the Domestic Council to Secretary Richardson of the Department of Health, Education, and Welfare for a major review of the vocational education system. The review was to develop a complete range of options for revising the system. The method of developing the options was to convene two groups, an "Analysis Group" responsible for quantitatively delineating the present status of vocational education, and a "Working Group" responsible for formulating options which would then be assessed against the current system status.

The scope of the Analysis Group defined here was confined to consideration of vocational education as administered by the U.S. Office of Education (USOE) in 1970 and the years immediately preceding. Programs such as those under the Manpower Development Training Act, Vocational Rehabilitation,

and Neighborhood Youth Corps were not considered. The allotted time for completing the basic research was 11 calendar days and 6 calendar days were used to prepare the draft report. The draft report was a basic document used by the officials involved in formulating alternative vocational education packages for further consideration. This final report incorporates the comments and suggestions offered by a variety of readers of the draft document.

ORGANIZATION OF THE REPORT

The second section is a general system overview. It presents the legislative background and a summary statement of the several definitions of vocational education that indicates the prevailing range of views. The major elements of the system are described and the limitations of the data about the various programs are reviewed. Section III deals with the major institutions, outside of the public school system, that provide vocational education. The public school vocational program is described in Section IV. The perspective is completed in Section V with a discussion of the roles of the several coordinating and regulating bodies that influence both public and private programs.

The report then turns to system evaluation. Section VI delineates the major objectives that have been espoused for vocational training and assesses the system's success in meeting these objectives. This analysis is refined in Section VII, which compares vocational education with manpower programs, in a cost-effectiveness framework. The main body of the report concludes with description and analysis of the role and impact of Federal funding.

Supporting documentation and supplementary analysis to the report are contained in five appendices, in a separate volume.

II. THE VOCATIONAL EDUCATION SYSTEM

INTRODUCTION

After first coming to grips with such semantic and historical issues as seem appropriate, this section describes the fundamental product of the system, a "marketable skill," and the types of institutions that provide vocational training to achieve this product. The section concludes with a description of the data limitations encountered in this effort.

DEFINITIONAL PROBLEMS

Surprising though it may seem, no definition for "vocational education" exists in the formal, legal sense, outside the statutory requirements that (a) the courses of study so characterized may not lead to or concern occupations that require a baccalaureate or higher degree, and (b) except for exemplary programs, vocational education may not involve students in elementary schools. Various States and communities have established requirements in terms of course loads, but these requirements have no uniform acceptance. The definitional problem is further compounded by the fact that some continue to use the term "vocational education" when referring to the early programs, which emphasized agriculture, while others use the same term to mean more recent programs with increasing emphasis on nonagricultural subjects.

In the past, knowledgeable individuals and the U.S. Office of Education have used the following definitions for "vocational education:"

- "The bridge between man and his work."[1/]
- "If vocation is defined as what a person does to earn a living, it follows that vocational education consists of the educational content and process through which one learns to become a competent worker."[2/]
- "From the start, vocational education has been a program whose purpose is to fit persons for useful employment."[3/]
- "Relevant education."[4/]
- "The organic curriculum."[5/]
- "Career development education."[6/]
- "Education for employment."[7/]
- "Involved is recognition that any dichotomy between academic and vocational education is outmoded, that all education to be acceptable must be relevant, that adaptability to change is as important as initial preparation, and that the needs and objectives of individuals should take precedence over those of the labor market."[8/]

1/ U.S. Department of Health, Education and Welfare, Office of Education, General Report of the Advisory Council on Vocational Education, 1968 (title).

2/ Ibid., p. xix.

3/ Lane C. Ash, "Cooperation Between Vocational Education and Other Federal Programs," The Bulletin of the National Association of Secondary-School Principals, Vol. 49, No. 301, May 1965, p. 25.

4/ Marvin J. Feldman, Making Education Relevant, Ford Foundation, 1966.

5/ David S. Bushurell, "An Education System for the 70's," Presented at the Aerospace Education Foundation Conference, Washington, D.C., 12 September 1967.

6/ Arthur R. Lehue, The Career Development Concept of Education, Chicago Public Schools, 1967.

7/ U.S. Department of Health, Education and Welfare, Office of Education, op.cit.

8/ Garth L. Mangum, Reorienting Vocational Education, The Institute of Labor and Industrial Relations and the National Manpower Policy Task Force, Washington, D.C., May 1968, p. 45f.

The various legal, educational, and course category characteristics that enter into informal definitions of "vocational education" make it impossible to produce a single, valid, succinct definition that properly encompasses the field. The best operational definition would seem to be: course(s) supported (at least in part) by funds from the vocational education acts. Accordingly, this discussion first covers the legislative evolution—the acts—and then briefly outlines the other dimensions of vocational education.

LEGISLATIVE HISTORY OF VOCATIONAL EDUCATION

Table 1 contains a summary of the main elements of the acts that provided the major Federal funding for vocational education. The most important change between 1917 and 1963 was the conceptual shift of emphasis from the needs of employers for skilled labor (the Smith-Hughes Act of 1917) to skills needed by people to assure their own welfare (the Vocational Education Act of 1963). The 1968 amendments to the 1963 act brought changes to vocational education, recognizing the need for special aid for the disadvantaged and also updating the focus <u>from</u> the rural and agricultural <u>to</u> more timely problems dealing with the cities and a technological economy. Specifically:

- Forty percent of the appropriations became designated for programs treating post-secondary students, the disadvantaged, and the handicapped.
- An additional $40 million were authorized for the disadvantaged.
- Five new sections instituted programs for innovation, consumer education, teacher training, curriculum development, and cooperative education.

OTHER DIMENSIONS OF VOCATIONAL EDUCATION

Vocational education courses historically have fallen into the following standard categories: agriculture, trades and industrial occupations, distributive education, health occupations, home economics, office occupations, and technical education. States report student enrollments, number of teachers, and expenditures in terms of those seven categories, plus an "other" category.

<u>Instructional Level</u>

From the viewpoint of educational levels, vocational education takes place at the secondary (high school), post-secondary (nominally, junior college),

TABLE 1.— Evolution of vocational education legislation

Agricultural subjects Trade Home economics Industrial subjects Studies, investigations, reports	Smith-Hughes Act of 1917 (PL 64-347) 50/50 formula
CATEGORIES Agriculture (including FFA and New Farmers of America) Home economics Trades and industry Distributive occupations Fishery trades	George-Barden Act of 1946 (PL 79-586) 100% matching by State and/or local funds
OTHER PROVISIONS Vocational guidance Secure data for program development Training and work experience Apprentice programs Purchase or rental of equipment and supplies	
Addition of practical nurse training	Title II of 1946 act (effective FY 1957)
Addition of area VE programs "State" now includes Virgin Islands, Puerto Rico, Guam, and the District of Columbia	Title III of 1946 act (effective FY 1959)
Supporting (general) education Agricultural subjects (not tied to farm or farm home) Home economics Distributive occupations Trade and industrial occupations Business and office Practical nurse training Area vocational education programs Work-study programs Residential schools Advisory Committee on Vocational Education	Vocational Education Act of 1963 (PL 88-210) No matching requirements
Limitation to high school or later Established national and State advisory councils Rehabilitation Research and training Exemplary programs (3-year limit) Residential schools Cooperative programs Work-study programs Curriculum development	1968 amendments (PL 90-576)

and adult (nominally, continuing education) levels.[9] On the secondary level, the local education activities usually establish separate curricula for students identified as participating in academic, vocational, and general programs. This separation amounts to a tracking system that seems to perform most effectively in the case of the academic program, which prepares students for further education—supposedly for entry into a 4-year college.

Table 2 shows quantitatively the significant differences, on a course-taken basis, between vocational education students at secondary, post-secondary, and adult levels. The profile for secondary students shows some 51 percent taking five or more courses (and 76 percent taking four or more), while 72 percent of the adult students are shown as taking only one. The post-secondary students show a somewhat bimodal distribution, with 31 percent taking one or two courses and 60 percent taking four or more. These data support the contention that one cannot produce a simple definition of "the vocational education student" on the basis of number and types of courses taken. This material comes from a nationwide survey, conducted by the National Center for Educational Statistics, of vocational education teachers in both vocational and comprehensive schools.[10] This survey elicited no information on whether the "student" population was full-time only, or part-time plus full-time. Evidently the different schools treat this differently.[11]

The Transition from "Vocational Education" to "Career Development"

Even more important changes have taken place in the orientation of some local education activities toward the field of vocational education itself. Growing numbers of educators see the need to begin attacking the attitudes of rigid separation of vocational education from, say, academic education, by reorienting their systems toward "career development." This approach runs counter to the historical thrust of vocational education but experiments with it are being made in Washington, D.C., Wilmington, Delaware, Philadelphia, Detroit, Albuquerque, and the State of Georgia.

9/ In actual fact, "post-secondary" includes courses held in a high school at night, during the day, in a junior college, in a community college, etc. This varies widely from State to State.

10/ E.R. Kay, "Vocational Education: Characteristics of Teachers and Students 1969," Adult and Vocational Education Surveys Branch, NCES.

11/ For specific information on this topic from five schools in each of three cities, see Operations Research, Inc., Secondary School Vocational Education Programs in Three Sample Cities—Programs, Students, and Personnel, Appendix: "Individual School Data," Washington, D. C., 20 November 1970.

TABLE 2.— Estimated numbers of courses taken by students enrolled in vocational education classes, 1969

Number of courses taken	Number of students (000)					
	Secondary		Post-secondary		Adult	
	No.	% of total	No.	% of total	No.	% of total
1	482	11.8	157	22.2	2,205	72.3
2	48	1.9	61	8.6	392	12.8
3	416	10.2	63	8.9	195	6.4
4	904	22.2	116	16.4	93	3.0
5 or more . . .	2,200	53.9	310	44.0	168	5.5
Total[1] . . .	4,079		706		3,050	

[1] Due to rounding, the numbers of students taking various numbers of courses do not add exactly to the totals.

Sources: Enrollments—from USOE, "Summary Data on Vocational Education, Fiscal Year 1969," April 1970. Data for FY 1969.

Percentages of students taking given numbers of courses—from a recent survey made by NCES, Adult and Vocational Surveys Branch. Returns amounted to 71 percent for secondary, 57 percent for post-secondary, 34 percent for adult schools. Figures for post-secondary and adult levels accordingly do not have the stability of the secondary data.

The career development approach has the following major facets:

- Extending exposure to employment options to elementary level pupils.
- Encouraging students who plan to attend 4-year colleges to develop a saleable skill
- Assuming more explicit responsibility for job placement of secondary-level students
- Facilitating reentry of dropouts into appropriate schools and programs
- More extensive noncollege counseling.

Most of the funding for these innovations come from the "Exemplary Program" portion of the 1968 amendments. Too little time has elapsed to allow a valid assessment of their eventual impact.

Importance of Geographic Variations

Differences in activities carried on in the name of vocational education reflect the differences that characterize the States and areas of our country. Relative to course enrollment, comparisons of the number of students who participate in agriculture and home economics to the number of those who take trades and industry or office courses reasonably follow the rural-urban mix of the States.

A study of State vocational education plans shows wide differences in the percent of students identified as "disadvantaged" who are enrolled in vocational education courses.12/ These differences are not readily understood. On the secondary level, the fraction regarded as disadvantaged ranges from 0 percent in Montana and Idaho, and 1 percent, 2 percent, and 6 percent in Massachusetts, South Carolina, and Louisiana, respectively, to 23 percent in Oklahoma, 24 percent in California, and up to 41 percent in Texas (the study sample consisted of 31 States; it did not include data on such interesting States as New York, Georgia, Mississippi, Alabama, and North Carolina). Evidently no information exists on the formal definitions, if any, used by the various states to identify "the vocational education student." At the very least, such information does not appear in the state plans.

THE PRODUCT OF THE VOCATIONAL EDUCATION SYSTEM: A "MARKETABLE SKILL"

Vocational education has as one of its objectives to provide its graduates with a "marketable skill." This implies an economic efficiency goal for vocational education. Presumably, if a skill is to be marketable, the productivity of the person trained must be equal in value to the wage rate offered for that skill by employers. No skill will be marketable if a person's productivity

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12/ It is apparent from the plans that the States made their own definitions of "disadvantaged" and made the assignment of students into that category or "nondisadvantaged."

is lower in value than the wage rate offered. A person who is trained in a non-marketable skill will suffer above normal unemployment and job turnover.[13/]

MAIN ELEMENTS OF THE SYSTEM

The "system" can be viewed either in terms of the institutions that provide vocational education, or in terms of the resources required to generate vocational education. Looking first at the institutions, there appear to be four main sources of vocational education: the proprietary school system; business orientation and training classes run within firms; the military; and the public school system. The approximate minimum expenditure level for each of these institutions for the 1969-70 school year is shown below:

	$(billions)
Proprietary schools	2-13
Business occupational training	*
Military vocational training	1.0
Public school vocational education	1.4

* At least as large as proprietary school expenditures.

As seen from the figures, public school vocational education was not the predominant mode in the United States in 1970. The role of the Federal government in vocational education is further diminished in view of the fact that total Federal spending in this period amounted to no more than $300-400 million. Section III of this report reviews how the first three major institutions cited are currently providing vocational education. The analysis of fourth major institution—the public school system—is more detailed and therefore, is presented separately, in Section IV. Before turning to the institutions, however, a review of the data problems encountered in analyzing them is in order.

DATA SHORTCOMINGS

As will be made apparent in the subsequent discussion of institutions providing vocational education, there are currently severe data limitations. It is not possible in any relatively short time period to easily obtain accurate information concerning program enrollment, enrollment by varying definition, enrollment by location down to the county level, etc., even on a sample basis.

We have also found the following data shortcomings that must be corrected if the data are to be of value for analysis and formulation purposes.

- Schools count all pupils as separate enrollees in both the first and second semesters.

13/ The marketable skill concept is more fully delineated in Appendix E.

- They count the occasional 1-day course given to adults as a full course; and they count everyone in the room the same as a student who has spent an entire semester on the subject.
- They count those who take the occasional course, (e.g., in auto mechanics training), including hobbyists, along with those enrolled in full-time programs.

There is a need to count "trainee hours" to get a fair picture or count "equivalent" full-time students.

At the same time, the information on faculty is available only for the public schools, and even that is aggregated by program. There appear to be no readily available data that will allow analysis of whether the growth and decline in faculty has matched the student growth and decline in local areas. This lack of information is particularly disturbing in the adult vocational education area. Another problem is the virtually complete lack of data concerning private firm training programs. Although it is known that private school and business training programs are more specifically oriented to particular jobs and work techniques, without hard data there can be no analysis of how these programs compare with the public programs in terms of alternative approaches. A similar dearth of information hinders evaluation and further development of public school-business cooperative programs. Finally, the abbreviated discussion of the supply and location of plant and equipment speaks plainly of the data shortage in this area.

In summary, it appears that there is an urgent need to institute a major data collection effort, at least on a sample basis, to determine the relevant target populations, the plant and equipment available to serve them, and the faculties needed to train them. We believe that no rational planning for the next decade can be undertaken without these fundamental data representing the main elements of the vocational system.

The first step in this process is the generation of standard definitions of vocational education for the various skills. If such definitions were constructed, public school systems could produce data that would justify rational planning at the national level.

A second possibility for improvement of information at the Federal level is the sampling of raw data at the State and local levels to overcome the distortion of information that inevitably results from summarization of data at each governmental level.

III. THE INSTITUTIONS PROVIDING VOCATIONAL EDUCATION: PROPRIETARY VOCATIONAL SCHOOLS AND TRAINING PROGRAMS, BUSINESS FIRMS, AND THE MILITARY

PROPRIETARY SCHOOLS AND TRAINING PROGRAMS

Introduction: The Scope of Private Vocational Education

In a recent position paper prepared by the National Association of Manufacturers[1/] to support a policy proposal, vocational education was defined as "specialized skill training which is provided in public secondary high schools." One can only sympathise with the NAM study group in adopting such a limited definition, for there is very little information available about private vocational schools and business training programs. The reason is, of course, that reviews of private school expenditures and internal educational expenditures by firms are available only to the Internal Revenue Service and are not centrally reported.

Table 3 is illustrative of the shortage of data about vocational education in the private sector. Despite the lack of hard data the available evidence clearly shows that private expenditures on vocational education are many times larger than expenditures on vocational education in the public schools. As shown in Table 3, there were, in 1966, some 7,000 private vocational schools in the country, with total revenues between more than $2 billion and more than $13 billion depending upon the basis of the estimate. Only one author (Fritz Machlup) has been found who was sufficiently heroic to estimate the cost of business training programs; the estimate, more than $3 billion annually, was for the year 1958. These estimates for private schools and business training compare with an estimate for the public schools of about $1.4 billion from combined Federal, State, and local sources (1969).

1/ "Vocational Education Study-Group Discussion Paper," xeroxed, undated.

TABLE 3.—Public and private vocational education: number of schools, enrollments, and cost of education, various times and sources

Institutional framework	Number of schools	Enrollments (millions)	Cost ($ billions)
PUBLIC SECTOR (1969) [1]			
All schools	-	7.98	1.369
Secondary	-	4.08	(Federal 0.255
Adult	-	3.05	State 0.467
Post-secondary	-	0.71	Local 0.647)
Special	-	0.14	-
PRIVATE SECTOR			
Private vocational schools (1966) [2]			
All schools	7,071	1.563	2.19-13.35 [3]
Trade and technical	3,000	0.836	-
Business	1,300	0.439	-
Cosmetology and barber	2,771	0.288	-
Business training programs (all programs — 1958)	-	-	(3.05) [4]

[1] Marvin Feldman, "Draft, Discussion Paper on Potential Administration Direction on Vocational Education," xeroxed, undated.

[2] A. Harvey Belitsky, Private Vocational Schools and Their Students Schenkman Publishing Company, Cambridge, Massachusetts, 1969.

[3] Low estimate is based on expenditures by the Veteran's Administration of $354 million on 982,651 enrollees ($360 per enrollee) at public and private schools from June 1966-June 1970; high estimate is based on expenditures of $20.5 million on 10,866 enrollees ($1,889 per enrollee) attending private schools in FY 1970 under programs administered by the Office of Education, HEW. Belitsky's estimate (note 2, above) of enrollees (1966) was used as the basis for both estimates.

[4] Estimate includes production loss. Fritz Machlup, The Production and Distribution of Knowledge in the United States, Princeton University Press, 1962.

Proprietary Vocational Schools: Some Comparisons With the Public Schools

Range and Diversity of Offerings. The number and the typically small size of vocational schools in the private sector suggest that this is a relatively competitive "industry," and the flexibility, adaptiveness, and innovation evidenced by these schools-qua-business appear to result directly from the fact that they find themselves in a competitive environment.

In a sample survey of 544 proprietary trade and technical schools, some 230 different occupational courses were offered, with 6 major categories accounting for the bulk of enrollment and course/instructional hours.[2/] In order of frequency, they were:

a. Automobile maintenance

b. Data processing

c. Drafting

d. Electronics

e. Medical services

f. Radio-TV.

The largest areas of training, in terms of student enrollment, were data processing, electronics, and medical services. It is generally acknowledged that one of the primary reasons private vocational schools can exist, indeed, fluorish, although they charge the student the full cost of his education including profits, is that they very often offer a type and/or quality of training unavailable in the public vocational schools. The relatively heavy emphasis in private vocational school curricula on the data processing and medical service areas, in contrast to the public schools, is perhaps one of the best illustrations of this point.

The general range and diversity of courses offered in the private vocational schools appears to be substantially greater than that in the public schools. This diversity is not only with respect to substance and course content but also with respect to level of course difficulty in a given area of instruction. The private schools appear to stratify their course offerings in a given area (electronics, for example) based on student background, prior educational experience, and innate ability. Although private vocational schools (unlike their public school counterparts) tend to minimize general education, they are flexible enough, at least in a great many instances to offer quasi-remedial

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2/ A. Harvey Belitsky, Private Vocational Schools and Their Students, Schenkman Publishing Company, Cambridge, Massachusetts, 1969, p. 12.

courses in English, mathematics, and the like, if they are directly relevant to the trade/technical course being pursued by the student.[3]

In summary, the training offered in private vocational schools appears to be more specific, more applied, and more job-oriented than comparable programs in public schools. General educational offerings are not mixed in or required nearly as frequently as they are in the public vocational schools. "Flexible accommodation to the needs and demands of students and their prospective employers is the outstanding operative feature of private vocational schools,... the schools have succeeded because they fill gaps which are not met by other training resources." [4]

Flexibility in Offerings. The degree of curricular and operating flexibility exhibited by private vocational schools, in contrast to their public school counterparts, is essentially a way of saying they are or tend to be much more "market oriented." There is a great deal of evidence to suggest that private vocational schools typically maintain much closer, immediate contact with industry in general and prospective employers in particular.

One of the main reasons for this may be that public vocational schools generally work through State and local governmental employment services and agencies, which are notoriously unresponsive. It is quite clear that the owners and management of private vocational schools recognize that the ultimate value, as well as financial success, of their institutions depend upon the student's success in securing a training-related job and his occupational advancement over the course of his job career. There can be little doubt that the administrators and faculty involved in public vocational education programs do not have nearly as direct and immediate an incentive to provide relevant, specific, and high quality training and then see to it that graduates secure well paying jobs.

Method of Operation. Of 128 private trade and technical schools recently surveyed, some 92 percent operated as "for profit" institutions (80 percent were corporations and 12 percent proprietorships and partnerships), with the other 8 percent operating as "non-profit" organizations. The number of multiple private vocational school ownerships and franchises is rapidly increasing. Of the same 128 trade and technical schools surveyed, some 78 were independent, single-unit operations, whereas 50 (or 40 percent) were branches of multiple unit operations or franchised. Virtually every private vocational school surveyed had an organized student job placement/employment service. Further, some 80 percent of the trade and technical schools had a student placement

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[3] In a recent survey/interview study conducted in Santa Clara, California, a frequently given reason for choosing a private vocational school over the corresponding public institution was that the student wanted, in fact, to learn a specific trade or skill and did not want any sort of training/education which was not specifically job-related.

[4] Belitsky, op. cit., p. 26.

follow-up procedure, whereby they "tracked" graduates and followed their progress. There appears to be a much greater emphasis on job placement/employment service and follow-up in the private sector vocational schools than in the corresponding public institutions.

It is of some interest to note that it has apparently been the pressure of the marketplace and of the relatively competitive situation in which private vocational schools find themselves which has led them to offer relevant, high quality training on such a consistent basis. That is to say, the educational and training services being offered by these schools are not, to any significant degree, the result of State or local regulatory activities. Only about 20 States license and/or regulate proprietary vocational schools and, although such requirements vary in rigor from State to State, they are, on the whole, minimal. The National Association of Trade and Technical Schools is a voluntary association of trade and technical schools in the private sector (recently formed) to, among other things, accredit such schools.

Quality of Education and Enrollees. Of particular importance in assessing the overall functioning and quality of private vocational schools is the "quality" in educational as well as socioeconomic terms of the student enrollees in these schools as compared to those attending comparable schools in the public sector. Detailed and reliable data on this point are scarce at best. The available evidence does suggest that students enrolling in private vocational schools are, on the average, of a higher educational level, from higher socioeconomic backgrounds, and apparently more highly motivated than their public school counterparts.

It is estimated that in excess of 75 percent of American youth do not finish a 4-year college of university. These students together with the vast number of public (high) school "dropouts," account for most of the private vocational school enrollment. Admission requirements vary tremendously among the country's approximately 7,000 private vocational schools. Business schools tend, by and large, to require a high school diploma, certificate, or the equivalent. Schools of cosmetology and barbering, on the other hand, almost never require this high a level of prior education. Trade and technical schools tend to be somewhere in between, with an increasing degree of importance being placed on a 4-year high school education as an entrance requirement. Furthermore, there is almost invariably a significant difference between the formal, stated educational requirements for admission to a trade or technical school in the private sector and the student's actual qualifications. The latter tend, quite typically, to be a good bit below the formal entrance requirements.

Prima facie evidence with respect to socioeconomic background and motivation is the fact that the private training programs cost anywhere from several hundred dollars to $2,000 and more per student. On the other hand, recent surveys have indicated that a relatively small proportion of students in private vocational schools are able to rely on their families (parents) or their savings to finance the cost of their vocational training. A relatively large

proportion of the students enrolled in private vocational schools concurrently hold either part- or full-time jobs.[5] Their earnings are supplemented by the extension of credit, the two most prevalent forms of such credit being the bank loan and the deferred tuition payment schedule.

Another noteworthy point with respect to the question of student motivation (as well as socioeconomic factors) is that of the order of 70 percent of the approximately 1.5 million students enrolled in private vocational schools successfully complete their training. The comparable figure for students enrolled in 2-year community colleges, which by and large tend to be "vocationally oriented," is between 30 percent and 40 percent.[6]

In summary, although the evidence is by no means conclusive, it does suggest that the average "quality" of a student enrollee in a private vocational school—in terms of socioeconomic background, quality and level of prior education and training, motivation, and inherent ability—may be greater than that of his public vocational school counterpart.

Given this apparent difference in the "quality" of the average student enrollee, what can be said with respect to the quality of the training provided by the public and private institutions and of the students they graduate? To begin with, since there may be a difference in the characteristics of private and public vocational school enrollees and graduates, it is difficult, if not impossible, to attribute differences in their post-school (job) performance to their training, as distinguished from their inherent differences as individuals. That is to say, if we use as indexes of the "quality of training received" such numbers as the ratio of graduates to total enrollees for a given period, or the ratio of job placements to total graduates, or such things as starting wages, first-year earnings, job turnover, and similar measures, it is nearly impossible to isolate the effect of the quality of vocational training per se from the effect of socioeconomic and other demographic variables.

These difficulties notwithstanding, a recent study (1969) conducted in Oklahoma corroborated what is generally felt to be the case.[7] Graduates from private vocational schools, in the same occupational fields, tend to be placed in or secure jobs with significantly higher starting salaries. Secondly, private vocational schools tend to offer courses that train students for employment less specifically tied to the geographic area in which the school is located.

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[5] This is another indication that the average enrollee in a private vocational school may be a student of significantly higher "quality" than his public school counterpart, who often is essentially "unemployable" prior to his vocational training.

[6] Congressional Record: 'Extensions of Remarks," 12 August 1970, p. E7581.

[7] Oklahoma State University Research Foundation, Occupational Training Information System: Final Report, Stillwater, Oklahoma, 30 June 1970.

In a survey of 1,264 students enrolled in private vocational schools in Oklahoma, 75 percent reported successfully completing their respective training programs. Of these students, 97 percent were successfully placed in jobs, more than half of which were in the field for which they were trained. Approximately 19.6 percent of the students graduating from private vocational schools in Oklahoma leave the State to seek employment. The corresponding figure for public vocational school graduates in Oklahoma is 5.2 percent.

Some 24 percent of those students surveyed and graduating from private vocational schools in Oklahoma reported starting salaries in excess of $7,000 per year; 20 percent reported annual starting salaries of less than $4,000. In general, the median annual starting salary of students graduating from private vocational schools in Oklahoma tended to be significantly higher than the median salary of students graduating from public school vocational programs.

This difference was especially pronounced in the technical, trades, and industry fields, where private vocational school graduates commanded median annual starting salaries of $6,400, as compared to $4,000 for public vocational school graduates (more than a 50 percent differential). The corresponding figures for business and office school fields are $4,000 and $3,600, respectively—a significant differential, both in absolute and in relative terms.

Any conclusions that might be drawn from these comparative figures for only one State must be very tentative. It cannot be readily determined what part of this observed differential in the median annual starting salaries of private and public vocational school graduates can be attributed to the nature and quality of the training received. Certainly no such determination can be made without taking into account and standardizing for other factors; for example, the age, sex, prior education, socioeconomic background, motivation, and inherent ability of these students.

Efficiency of the Proprietary School. One last and highly relevant question with respect to private vocational education and training is whether and to what extent it is "produced" efficiently and how private institutions compare with the public sector schools in this regard. Any inquiry into the efficiency with which a product, or in this case a service, is produced implies the measurement of outputs and resources used as inputs. In measuring inputs, we usually focus on their costs. There is almost invariably the question of what costs to include and the like.

To make any valid comparisons between private and public vocational schools, given their relative "costs of production," we must choose a standard unit of output measure. Only then can we make such statements as, given the cost of private and public sector vocational education, one appears to be more efficient, inasmuch as for a given amount/value of resources, that sector produces more education or training.

A recent study conducted by the Center for Naval Analyses (CNA), one of the few studies that directly compare the relative efficiency of private

and public vocational training establishments, takes as its output measure "hours of classroom instruction."[8] Alternative measures of the "output" of a vocational education and training facility might be numbers of graduates (of a given "quality"), numbers of graduates actually placed in training-related jobs, or some sort of earnings (differential) index.

Although the CNA study deals only with a comparison of private technical vocational schools and U.S. Navy in-house, "Type A" schools, its findings are of interest. Some parallels can certainly be drawn between civilian and military public vocational schools. However, even if such parallels could not be drawn, a comparison of the military schools with the private technical institutions is significant in and of itself. In FY 1969 the Department of Defense (DOD) spent nearly $1 billion on training, for noncareer enlisted personnel, that can be classified strictly as "vocational." This is roughly four times the total HEW expenditures on vocational education and training in FY 1969. DOD spending represents more than 40 percent of the total of all public (Federal, State, and local) expenditures in this area of education.

The results of the CNA study need careful interpretation, although the orders of magnitude reported are unmistakable in suggesting that private vocational schools are relatively efficient vis-a-vis public (U.S. Navy, electronic technician Type A) schools. The average Navy in-house cost per "ET-A" graduate is $2,879 (1964-1968). The corresponding cost, as measured by tuition and fees, associated with virtually identical technical electronic course programs at eight private vocational schools is between $983 and $1,899, with a simple average of $1,436.[9] Even the highest of the eight private school costs ($1,899) is only on the order of 65 percent of the corresponding (adjusted) per-graduate cost estimates for the Navy's in-house electronic technician training.

One important source of or explanation for the significant difference in the private and public training costs may be the average class size. There is some, albeit sketchy, evidence which suggests that the average class size may be larger in private vocational schools than in their public (Navy) counterparts. Along this same line, it is quite possible that differences in the "quality of instruction and training," in terms of class size, course length, quality of instructors' facilities and/or equipment and instructional materials, account largely, if not entirely, for the observed differences in costs. However, even if this were the case, the quality of the education and training in the public (Navy) school(s) would have to be some 65 percent greater than even the best (most costly) of the eight private vocational schools cited in the CNA study. In any case, as is suggested, the essential question ought not to revolve around the comparative quality of the inputs used in the private and public sector schools but rather the quality and performance of their outputs—the graduates.

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[8] David W. O'Neill, Meeting the Navy's Needs for Technically Trained Personnel: Alternative Procurement Strategies, Institute of Naval Studies of the Center for Naval Analyses (forthcoming).

[9] Ibid., p. 21.

Conclusions. Given this evidence, however tentative, as to the relative efficiencies of private and public vocational schools, what are the policy implications? Only one—that more attention should be paid to the vocational and technical schools in the private sector. By extension, more serious consideration should be given by responsible public education officials at all levels of government, to the possibility of contracting to these schools the vocational and technical training being directly supported by Federal, State, and local funds.

Nearly every private vocational school (96 percent) has trained students under both the Veterans and Vocational Rehabilitation programs. Yet, on the other hand, there is virtually no instance where a State or local authority has allocated any part of its Federal grant-in-aid funds under the 1963 Vocational Education Act to private vocational institutions. There is no small amount of evidence that the country's private vocational schools have been and continue to be relatively underutilized. It is estimated that in the neighborhood of 0.5 million additional students could be accommodated in the existing facilities of the nearly 3,000 private trade and technical schools.[10/] Similar statistics on capacity utilization are more difficult to obtain for the 4,000 private schools of business, cosmetology, and barbering.

The use (or lack thereof) of private vocational schools under the Manpower Development and Training Act (MDTA) is illustrative. At first, the State authorities were given the option of using either private or public schools for training persons under MDTA. In time, it became evident that given this option the States seldom, if ever, choose to use proprietary schools. Congress then passed legislation which required the States to use private vocational schools if the quality of the training equaled that available in the public school and it could be provided at lower cost. Several States still refused to allocate MDTA funds to private vocational schools, using the "legality" of their aiding proprietary education as a basis for such refusal.

Widespread and frequent opposition to the use of private vocational schools under MDTA has persisted, despite their consistent ability to underbid their public school counterparts when competing for contracts. There is some evidence that State education authorities have purposely sought to limit the MDTA funds going to the private sector in order to expand the public vocational school facilities in their jurisdiction. It has frequently been charged that to achieve this end, State vocational education directors unfairly and unjustifiably judge private school facilities and/or programs as being of unacceptable quality.

Recently, in the context of a contract awarded to the United Business Schools Association (UBSA), HEW has taken steps to begin to at least partially redress the imbalance in the use of Federal funds for private and public vocational schools. The primary objective of this pilot contract was "to simplify and speed up the procedures for referring individuals for private school training,

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10/ Congressional Record: "Extensions of Remarks," 12 August 1970, p. E7581.

to expand use of private schools in Manpower Training and to ascertain the ability of these institutions to serve disadvantaged persons." 11/

TRAINING PROGRAMS PROVIDED BY BUSINESS FIRMS

There is virtually no aggregate information available about the numerous and diverse training programs in vocational education offered by business firms to their employees. The curricula offered vary widely—from informal programs of 1 or 2 hours in on-the-job training to operate a particular machine, to formal classroom and work-study programs, such as those the telephone companies use to train their technical staffs. Several general observations may be made, however, which are pertinent to this study.

First, American industry is only superficially involved in public vocational education12/ despite the fact that the costs of their own in-house programs are necessarily inflated by the wages that must be paid during the period of training. One estimate of the cost of training technical personnel alone to maintain and operate the Bell Telephone System is put at $275 million annually (1969), about half of which is estimated to be for wages of personnel in training.

Despite the success of a number of cooperative programs between industry and the public school vocational education system, the involvement of business and industry has been confined in most cases to the donation of equipment and nominal participation in an advisory role. Administrators in the public system are hesitant to invite industry to become actively involved for fear of precipitating major changes. Businessmen, disillusioned by the nonresponse of public vocational education to providing the skills they need, and operating under union contracts that minimize the benefits of their involvement, have turned to in-house training programs. The result has been a downgrading of public vocational education by businessmen in favor of requiring higher educational requirements. "Employers are convinced that by raising their demands, they will be more likely to remit an ambitious disciplined work force that will be more productive than workers who terminated schooling earlier," despite evidence to the contrary.13/

OCCUPATIONAL TRAINING IN THE MILITARY

Each year hundreds of thousands of young men, new enlisted recruits to the four military services, enter and graduate from schools operated by the

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11/ The Secretary of HEW, Report to the Congress on the Manpower Development and Training Act, 1967, p. 27.

12/ National Association of Manufacturers, op. cit.

13/ Ibid.

military that provide a wide range of technical, vocational, and administrative courses. For the most part entry into this training follows completion of 8 to 10 weeks of basic training in military survival and combat skills.

Course lengths in these service schools vary from as few as 5 weeks (e.g., clerk typist school) to 50 or more weeks (e.g., some of the electronic technicians in the Navy who specialize in very complex equipment get very long formal training). The types of training run the gamut from highly specific technical education to administrative courses, to other training that one might consider of no value in the civilian labor market (e.g., advanced infantry training).

Regardless of where one wants to draw the line as to what military schools provide useful training for the civilian sector, the military must be regarded as a significant source of supply in the vocational education training area.

Number of Graduates and Expenditures: FY 1970-FY 1969

Tables 4 through 7 present some relevant information on the scope and significance of occupational training provided by the military. The detailed notes appended to Table 4 explain the data sources and methodology used to generate the numbers in these tables. The reader is cautioned that although the orders of magnitude of the estimates are valid, precise correspondence with estimates from other sources is not to be expected. In order to "carve out," as it were, information on particular segments of the military's vast training establishment, and also to go back in time, it was necessary to use indirect estimating procedures.

Highlights. Of the nine broad occupational categories, category 0, which primarily represents advanced training in combat specialities, is the least significant as a generator of occupational skills useful in the civilian sector. The other eight categories clearly involve training with high, if not 100%, transferability potential.

If we ignore graduates and expenditures associated with occupational category 0, then during FY 1969 the services spent a little over $1 billion on occupational training for about 580,000 young men.[14] The impact of the Viet Nam buildup on the military's role in this area can be seen in the annual expenditures for the years 1960-1963. The combined average expenditure (all services, all categories) was about $760 million during this period.[15]

14/ The cost was actually higher than this, since the opportunity costs of draftees are not figured into the estimates. Draftees are forced to subsidize the rest of society in national defense to the extent that their military wages are less than the civilian wages they could earn.

15/ Physical resources used in training, students' time, teachers' time, building maintenance, etc., were valued at 1969 costs during all years. Thus the growth in actual dollar expenditures over this period were obviously greater because of the inflation factor. See explanatory notes to the tables.

TABLE 4.—Army: Annual graduates (G) and expenditures (E); entry level occupational training given new recruits, by occupational area, FY 1960 - FY 1969

(Expenditures in $ millions)

Major DOD Occupational Category	FY 1960		FY 1961		FY 1962		FY 1963		FY 1964		FY 1965		FY 1966		FY 1967		FY 1968		FY 1969	
	G	E	G	E	G	E	G	E	G	E	G	E	G	E	G	E	G	E	G	E
0 – Infantry, gun crew, seamanship	60,436	78.5	54,113	71.7	54,202	71.8	55,316	73.0	71,664	90.6	67,000	85.6	133,177	156.5	164,729	190.4	174,834	201.3	161,948	
1 – Electronic equipment repair	17,036	49.4	15,253	44.7	15,279	44.7	15,593	45.6	20,200	57.8	18,886	54.3	18,565	53.4	22,974	65.1	24,383	68.8	22,586	
2 – Communications and intelligence	14,805	24.9	13,256	22.7	13,278	22.8	13,551	23.2	17,555	28.8	16,413	27.2	33,181	50.7	41,060	61.7	43,579	65.2	40,367	
3 – Medicine, dentistry	12,371	17.5	11,077	15.9	11,095	15.9	11,323	16.2	14,669	20.3	13,715	19.2	18,170	24.7	22,485	30.0	23,865	31.7	22,106	
4 – Other technical and allied specialties	4,462	7.8	3,995	7.0	4,002	7.1	4,084	7.2	5,291	9.0	4,946	8.5	6,715	11.2	8,310	13.6	8,820	14.4	8,169	
5 – Administrative and clerical specialties	35,694	27.2	31,959	24.8	32,012	24.8	32,670	25.2	42,325	31.6	39,570	29.8	56,881	41.1	70,389	50.0	74,706	52.8	69,200	
6 – Electrical/mechanical equipment repair	37,316	45.0	33,412	41.0	33,467	41.0	34,155	41.7	44,249	52.2	41,369	49.2	69,916	78.8	86,520	96.0	91,827	101.5	85,059	
7 – Crafts	5,070	7.0	4,540	6.4	4,547	6.4	4,641	6.5	6,012	8.1	5,621	7.6	13,825	16.7	17,108	20.4	18,158	21.5	16,820	
8 – Service and supply	15,211	16.0	13,619	14.7	13,641	14.7	13,922	14.9	18,036	18.2	16,862	17.3	44,636	39.6	55,236	48.2	58,624	50.9	54,303	
Total	**202,401**	**273.3**	**181,224**	**248.9**	**181,523**	**249.2**	**185,255**	**253.5**	**240,001**	**316.16**	**224,382**	**298.7**	**395,066**	**472.7**	**488,811**	**575.4**	**518,796**	**608.1**	**480,558**	

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NOTES TO TABLES 4-7

1. Estimates of Course Graduates per Year

Data for FY 1965 and FY 1969, giving the distribution of personnel completing entry-level enlisted skill training by major DOD occupational category, were secured from service submissions to ASD (Manpower) in reponse to DOD Instruction: 7730.31, of 30 September 1965.

The observed percentage distribution by occupation for FY 1965 was assumed to be valid for FY 1960-1965; that for FY 1969 was assumed to hold for FY 1966 through FY 1969.

Estimates of the total number of new recruits graduating from service schools each year were obtained from data giving annual first term accessions by service (see Selected Manpower Statistics, Directorate For Statistical Services, Office of the Secretary of Defense). Annual A accession flows were converted into annual course graduate flows by averaging previous and current year accession flows, the weights given to the previous year's flow being equal to the fraction of a year that it takes a new accession to complete his occupational training course. This procedure assumes that the annual rate of accession flow is the same from month to month within a year.

2. Estimates of Total Expenditures per Year

Estimates of average course lengths were used to convert estimated annual flows of graduates into estimated student man-years of instruction. Estimates of military faculty and support personnel inputs as well as other inputs (civilian instructors, building depreciation, teaching aids, etc.), were derived from estimates of student input-output relationships applicable to service schools. Both the course-length estimates and input estimates were taken from: Dave O'Neill, "Determinants of Labor Turnover Costs in the Military" in Studies Prepared for the President's Commission on an All-Volunteer Military, U.S. Government Printing Office, Washington, D.C., 1970.

Physical input estimates were multiplied by standard rates for costing military personnel services to obtain expenditure estimates. (Standard rates were taken from DOD Instruction: 7220.25, 1 August 1968.) The rates for FY 1969 were applied to input estimates for all the years. Thus the expenditure estimates have already been adjusted for changes in input costs and represent changes in real quantities of resources devoted to technical education over time.

3. On-The-Job Training in the Navy and Air Force

Expenditure estimates include "imputed" costs of training of the recruits who were sent straight to duty assignments after basic training.

TABLE 5.— Navy: Annual graduates (G) and expenditures (E); entry level occupational training given new recruits, by occupational area, FY 1960-FY 1969

(Expenditures in $ millions)

Major DOD Occupational Category	FY 1960		FY 1961		FY 1962		FY 1963		FY 1964		FY 1965		FY 1966		FY 1967		FY 1968		FY 1969	
	G	E	G	E	G	E	G	E	G	E	G	E	G	E	G	E	G	E	G	E
0 – Infantry, gun crew, seamanship	445	.9	464	.9	504	.9	482	.9	451	.9	473	.9	15,602	10.5	16,043	10.7	14,552	9.8	17,542	
1 – Electronic equipment repair	19,122	88.1	19,954	91.7	21,674	99.1	20,713	94.9	19,383	89.2	20,354	93.4	18,122	83.8	18,634	86.0	16,903	78.5	20,376	
2 – Communications and intelligence	11,384	29.8	11,886	31.0	12,902	33.5	12,331	32.1	11,539	30.2	12,118	31.6	15,602	39.9	16,043	41.0	14,552	37.4	17,542	
3 – Medicine, dentistry	6,048	11.2	6,311	11.7	6,854	12.6	6,551	12.1	6,130	11.4	6,438	11.9	7,681	14.0	7,898	14.4	7,164	13.1	8,636	
4 – Other technical and allied specialties	1,690	4.4	1,763	4.6	1,915	5.0	1,830	4.7	1,713	4.5	1,799	4.7	1,320	3.5	1,357	3.6	1,231	3.3	1,484	
5 – Administrative and clerical specialties	6,671	7.6	6,961	7.9	7,560	8.5	7,225	8.1	6,761	7.6	1,100	8.0	9,601	10.6	9,872	10.8	8,955	9.9	10,795	
6 – Electrical/mechanical equipment repair	37,622	96.9	39,258	100.8	42,634	109.0	40,751	104.4	38,134	98.1	40,045	102.7	36,125	93.3	37,145	95.7	33,693	87.4	40,617	
7 – Crafts	2,668	4.8	2,784	5.0	3,024	5.4	2,890	5.2	2,705	4.9	2,840	5.1	8,041	12.9	8,268	13.2	7,566	12.1	9,041	
8 – Service and supply	3,202	2.3	3,341	2.4	3,629	2.5	3,468	2.4	3,245	2.3	3,408	2.4	7,801	5.1	8,021	5.2	7,276	4.7	8,771	
Total	88,852	246.0	72,716	256.0	100,693	276.5	96,241	264.8	70,061	249.1	94,575	260.7	119,895	273.6	123,328	280.6	111,826	256.2	134,804	

TABLE 6.—Air Force: Annual graduates (G) and expenditures (E); entry level occupational training given new recruits, by occupational area, FY 1960-FY 1969

(Expenditures in $ millions)

Major DOD Occupational Category	FY 1960		FY 1961		FY 1962		FY 1963		FY 1964		FY 1965		FY 1966		FY 1967		FY 1968		FY 1969	
	G	E	G	E	G	E	G	E	G	E	G	E	G	E	G	E	G	E	G	E
0 – Infantry, gun crew, seamanship	0	0	0	0	0	0	0	0	0	0	0	0	1,523	2.2	1,721	2.5	1,315	2.0	1,324	
1 – Electronic equipment repair	15,556	89.7	20,033	113.9	22,263	125.9	20,684	117.4	18,926	107.9	17,523	100.3	19,544	111.2	22,091	125.0	16,879	96.8	16,997	
2 – Communications and intelligence	8,912	21.7	11,477	27.6	12,755	30.6	11,850	28.5	10,843	26.2	10,039	24.3	9,518	23.1	10,759	26.0	8,220	20.1	8,278	
3 – Medicine, dentistry	3,484	8.8	4,486	11.1	4,986	12.3	4,632	11.5	4,239	10.6	3,924	9.8	3,427	8.6	3,873	9.7	2,959	7.5	2,980	
4 – Other technical and allied specialties	1,215	2.1	1,565	2.6	1,739	2.9	1,616	2.7	1,479	2.5	1,369	2.3	2,284	3.7	2,582	4.2	1,973	3.2	1,987	
5 – Administrative and clerical specialties	14,179	14.1	18,259	17.9	20,292	19.7	18,853	18.4	17,251	16.9	15,972	15.8	21,575	20.9	24,387	23.4	18,632	18.2	18,763	
6 – Electrical/mechanical equipment repair	26,737	74.4	34,431	93.8	38,265	103.5	35,551	96.6	32,530	89.0	30,118	82.9	50,510	134.4	57,093	151.0	43,621	117.0	43,726	
7 – Crafts	2,917	4.0	3,756	5.1	4,174	5.6	3,878	5.2	3,549	4.8	3,286	4.5	4,188	5.6	4,734	6.3	3,617	4.9	3,642	
8 – Service and supply	7,940	5.3	10,225	6.7	11,364	7.3	10,558	6.9	9,660	6.3	8,944	5.9	14,341	9.1	16,210	10.2	12,385	8.0	12,472	
Total	80,940	220.1	104,232	278.7	115,838	307.8	104,622	287.2	78,477	264.2	91,175	245.8	126,910	318.8	143,450	358.3	109,601	277.7	110,369	

TABLE 7.—Marine Corps: Annual graduates (G) and expenditures (E); entry level occupational training given new recruits, by occupational area, FY 1960-FY 1969

(Expenditures in $ millions)

Major DOD Occupational Category	FY 1960		FY 1961		FY 1962		FY 1963		FY 1964		FY 1965		FY 1966		FY 1967		FY 1968		FY 1969	
	G	E	G	E	G	E	G	E	G	E	G	E	G	E	G	E	G	E	G	E
0 – Infantry, gun crew, seamanship	14,219	16.4	12,160	14.6	12,536	14.9	11,234	13.8	12,746	15.1	12,885	15.2	44,594	43.7	48,807	47.4	56,594	54.4	60,715	
1 – Electronic equipment repair	3,327	15.0	2,845	12.9	2,933	13.3	2,629	12.0	2,982	13.5	3,015	13.7	2,043	9.5	2,236	10.3	2,593	11.9	2,782	
2 – Communications and intelligence	2,891	5.6	2,473	4.9	2,549	5.0	2,284	4.6	2,592	5.1	2,620	5.2	4,579	8.5	5,012	9.3	5,811	10.6	6,234	
3 – Medicine, dentistry																				
4 – Other technical and allied specialties	871	1.3	745	1.1	768	1.2	688	1.0	781	1.2	790	1.2	141	.2	154	.2	179	.3	192	
5 – Administrative and clerical specialties	6,971	4.6	5,961	4.0	6,146	4.1	5,508	3.7	6,249	4.2	6,317	4.2	5,072	3.5	5,552	3.8	6,437	4.3	6,906	
6 – Electrical/mechanical equipment repair	7,288	25.8	6,232	22.3	6,425	23.0	5,758	20.7	6,533	23.3	6,604	23.6	5,565	20.1	6,091	21.8	7,063	25.1	7,577	
7 – Crafts	990	1.8	847	1.6	873	1.7	782	1.5	888	1.7	897	1.7	1,127	2.1	1,234	2.3	1,430	2.6	1,535	
8 – Service and supply	2,970	3.3	2,540	2.9	2,619	3.0	2,347	2.7	2,663	3.0	2,692	3.0	7,327	7.1	8,019	7.8	9,298	8.9	9,975	
Total	**39,527**	**73.8**	**33,803**	**64.3**	**34,849**	**66.2**	**31,230**	**60.0**	**35,434**	**67.1**	**35,820**	**67.8**	**70,448**	**94.7**	**77,105**	**102.9**	**89,405**	**118.1**	**95,916**	

It has been estimated elsewhere that the combined expenditures by Federal, State, and local governments on vocational education in the civilian sector amounted to about $1.4 billion in FY 1969. This inclusion of the military's contribution, then, practically doubles the role of the government outlay for occupational training.[16]

The military's role with regard to some special occupational categories deserves special note. It is widely believed that there is a shortage in the civilian sector of workers trained in paramedical specialties, electronic equipment repair, and the crafts. In FY 1969 there were 34,000 paramedical personnel, 63,000 electronics technicians, and 31,000 craftsmen graduated from military training programs. If we assume that at least half will leave the military at the end of their first tour of duty, then we can expect that full half of this large volume of technically trained men will join the potential supply in the civilian sector.

Utilization of Military Training in the Civilian Sector

How many of thousands of young men each year, having chosen not to make a career of the military, utilize the skills they acquired in the military in the civilian labor market? Time limitations allowed only a brief survey of existing studies on this issue.

A study by Richardson[17] covered 418 former enlisted airmen who had separated from active duty before reaching retirement. About 50 percent of these men responded that their Air Force training "helped qualify them for their present job"; also, 52 percent said that their military training was absolutely or at least very necessary in performing their present (civilian) job. Another study by Jurkowitz[18] found 25 percent of a group of young, former servicemen were in a post-service job that was related to what they were trained for in the military. As these differing findings suggest, it is difficult without extensive research to get any firm idea of what proportion of ex-servicemen utilize their military

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16/ If the additional occupational training that the military provides enlisted career personnel were considered relevant, then the total FY 1969 expenditure figure would increase by about $250 million.

17/ Robert B. Richardson, An Examination of the Transferability of Certain Military Skills and Experience to Civilian Occupations, Ph.D. thesis, Cornell University, 1967.

18/ Eugene L. Jurkowitz, An Estimation of the Military Contribution to Human Capital, Ph.D. thesis, Columbia University, 1970.

vocational training in the civilian sector. However, the question raised here can be appreciated even without precise empirical data.

Whatever the percentage of personnel who utilize their military vocational training may in fact be, there is a strong a priori reason for believing that it will not be at the socially optimal level. This reason is that given the existence of the draft, the military takes in each year large numbers of so-called draft-motivated volunteers, who are very hard to distinguish from genuine volunteers. In fact, the military's assignment policies, if anything, probably tend to treat these draft-motivated men better than the true volunteers. Assignments to the better vocational and technical schools that provide more extended training tend to be based on the scores achieved on the Armed Forces Qualification Test, and the more educated, draft-motivated volunteers tend to score higher. The upshot is that it is highly likely that the draft-motivated group receives proportionately more of the military's vocational and technical training than the true volunteer group. Also, it is highly likely that the draft-motivated group will contain many young men who have no interest in any particular training the military could offer. The final link in the argument, then, is that on leaving the military, a larger number of draft-motivated men, as compared with men who are not draft-motivated, will fail to utilize their military-acquired skills. Thus changes in assignment policy are in order if the military is to aid in reducing the shortage of vocational training in the civilian sector.

Who Receives Military Occupational Training

Table 8 compares the formal educational attainment of all enlisted men on active duty with that of all males in the civilian labor force. As of 1967, 82.7 percent of all enlisted men had at least completed high school, compared with 59 percent of the male civilian labor force. Part of this large differential is attributable to the age distributions of the two labor forces; but data in Table 9 show that most of this large difference is not due to the age differential factor.

The Armed Forces Qualification Test (AFQT) is administered to all draftees and applicants for enlistment. It is not a pure IQ test; performance is influenced both by innate ability and by educational attainment and other experiences. Benjamin Karpinos, a medical statistician in the Office of the Surgeon General, has succinctly stated the goals of the AFQT:

> ...the AFQT was delegated a dual objective: a. To measure the examinee's general mental ability to absorb military training within a reasonable length of time, so as to eliminate those who do not possess such ability—a qualification device; and b. to provide a uniform measure of the examinee's potential general usefulness in the service, if qualified on the test—a classification device. It was hence specifically

TABLE 8.—Cumulative percentage distributions of military and civilian labor forces, by educational attainment

Year	No. (000)	Percentage of men who completed 8 or more years of school				
		8	9-11	12	13-15	16+
Enlisted men (all services)						
1952	3,109	NA	83.4	52.6	12.7	2.8
1956	2,814	95.5	86.3	55.2	12.3	2.8
1960	2,159	98.0	92.4	66.1	13.5	1.5
1962	2,323	98.6	95.1	72.7	15.7	1.4
1965	2,507	98.5	96.2	81.6	19.7	1.3
1967	2,982	99.2	97.1	82.7	21.5	2.2
Male civilian labor force (age span 18-64 years)						
1952	38,658	92.3	60.6	41.2	16.6	8.3
1957	40,687	93.6	67.6	46.9	18.8	9.6
1959	41,324	94.5	68.5	47.8	19.7	10.5
1962	42,693	95.2	72.0	52.0	22.4	11.9
1965	44,111	96.0	75.7	56.0	23.2	12.6
1967	44,581	96.7	78.0	59.0	25.3	13.3
1968	45,213	97.0	79.5	60.7	26.1	13.7

Source: D. Reaume and W. Oi, "The Educational Attainment of Military Civilian Labor Forces," in Studies Prepared for the President's Commission on an All-Volunteer Military, U.S. Government Printing Office, Washington, D.C., 1970. Data on active duty military personnel were taken from: Office of the Secretary of Defense, Military Manpower Statistics, Table P255, Data on the educational attainment of male civilian labor force are from E. Waldman, "Educational Attainment of Workers, March 1968" Monthly Labor Review, February 1969, pp. 14-22 and 19 (see especially Table A, p.A-5).

TABLE 9.—Percentage distribution of educational attainment of the civilian male labor force, by age, 1968

Years of education	Males 18-34 yrs old	Males 35 yrs old and over
8	95.2	85.9
9-11	89.9	71.4
12	70.6	53.2
13-15	29.6	23.5
16+	13.5	13.6
No. (000)	17,214	30,041

Source: Reaume and Oi (see Table 8).

intended to predict potential success in military training and performance ("military Trainability"). It has been validated for that purpose.[19]

Again, in test performance we see a significant differential. Table 10 shows the AFQT score distribution for all male accessions to the military services in 1965 with an estimated distribution for all draftees examined in 1965. The draftee distribution should be a fairly good estimate of the distribution of all draft-age males by AFQT. It may be slightly downward biased because of the college deferment situation. As shown in the table, fully 83.4 percent of accessions to the military are in the "upper three" or "trainable" mental score categories, while only about 65 percent of all male draftees scores this high.

Is the Military "Creaming"? The very large differential in the two labor quality indicators in Table 10 has led some observers to the hypothesis that, given the existence of the draft, the military has been creaming off more high achievement recruits than it really needs. This leads to a misallocation of society's scarce manpower resources and contributes to an inequitable income distribution as well. The military counters by arguing that the increasing technological complexities of its equipment "require" that recruits be of very high mental capability.

A careful study by Reaume and Oi compared the educational attainment of males in the civilian sector with males in the Navy and Air Force in comparably detailed occupational categories. Tables 11 and 12 present their main findings. The distributions in the top half of the tables show what the educational attainment of servicemen would be if the military staffed its occupations the way civilian firms staff comparable occupations. The lower half of the table shows the actual educational attainment of servicemen in these same occupations.

The figures show decisively that simple "occupational-mix" differentials cannot explain why the military "requires" such high quality recruits. Although this evidence is only partial (i.e., it could always be that occupations are not really comparable), it is strongly suggestive of the conclusion that the military has been creaming. The significant policy implication for vocational education is that military schools could be used for providing useful technical training to more needy youngsters from less favorable socioeconomic backgrounds.

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[19] Benjamin D. Karpinos, "The Mental Qualification of American Youths for Military Service and its Relationship to Educational Attainment," in the 1966 Proceedings of the American Statistical Association, social statistics section.

TABLE 10.—Estimated percentage distribution of draftees examined in 1965 and actual distribution of all male accessions to military service in 1965, by mental group

Mental group	All draftees	All accessions
I	5.7	5.5
II	26.5	31.2
III	32.9	46.7
IV (qualified)	10.1	16.5
IV (trainability limited)	10.7	0.0
V (failed AFQT)	13.2	-
Administrative acceptees[2] . . .	0.9	-
Total	100.0	100.0

Source: U.S. Army, Office of the Surgeon General, Supplement to Health of the Army, May 1966.

TABLE 11.—Cumulative percentage distribution of military and civilian labor forces in comparable Navy occupations, by level of education, 1968

Major DOD occupational category	No. (000)	Years in school completed					
		8	9-11	12	13-15	16	17+
Civilian educational distribution							
0 Infantry, gun crew	66.9	76.8	60.4	37.3	8.3	1.6	0.3
1 Electronic equipment repair	78.3	99.8	95.8	77.2	26.3	5.8	1.3
2 Communications and intelligence	62.2	98.5	92.8	76.2	24.8	6.1	1.1
3 Medicine, dentistry	33.1	94.3	84.9	67.9	34.1	14.8	8.1
4 Other technical and allied specialties	12.8	95.6	90.5	70.7	29.9	11.6	5.3
5 Administrative and clerical specialties	76.6	96.3	90.2	75.1	33.6	13.7	4.0
6 Electrical/mechanical equipment repair	186.0	91.1	78.4	54.4	10.1	1.3	0.3
7 Crafts	53.7	83.5	67.6	41.8	6.9	0.7	0.1
0 Service/supply	51.2	84.8	71.5	49.2	14.8	3.1	0.8
All occupations	620.8	91.1	80.6	59.7	18.1	4.9	1.5
Navy enlisted educational distribution (first-term)							
0 Infantry, gun crew	66.9			75.5	10.7		
1 Electronic equipment repair	78.3			96.5	33.6		
2 Communications and intelligence	62.2			93.5	30.1		
3 Medicine, dentistry	33.1			95.8	33.2		
4 Other technical and allied specialties	12.8			94.3	40.9		
5 Administrative and clerical specialties	76.6			95.3	35.0		
6 Electrical/mechanical equipment repair	186.0			85.1	12.4		
7 Crafts	53.7			82.0	10.8		
0 Service and supply	51.2			81.5	6.7		
All occupations	620.8			87.8	20.1		

Source: Roaume and Oi (see Table 8).

TABLE 12.—Cumulative percentage distribution of military and civilian labor forces in Air Force occupations, by level of education, 1968

Major DOD occupational category	Years in school completed						
	No. (000)	8	9-11	12	13-15	16	17+
Civilian educational distribution							
0 Infantry, gun crew	8.7	86.7	74.4	55.8	25.7	17.5	4.8
1 Electronic equipment repair	101.8	99.4	95.0	76.8	28.1	7.8	2.2
2 Communications and intelligence	47.3	98.0	93.3	81.1	36.4	12.2	3.5
3 Medicine, dentistry	21.5	94.2	86.4	68.3	31.0	12.1	6.9
4 Other technical and allied specialties	19.0	98.0	93.3	76.6	35.4	14.8	6.1
5 Administrative and clerical specialties	161.7	98.6	95.4	82.0	35.0	11.1	3.2
6 Electrical/mechanical equipment repair	193.5	96.8	88.6	65.6	17.2	4.5	0.8
7 Crafts	49.3	89.7	76.5	50.7	9.1	1.0	0.1
8 Service/supply	106.0	90.0	78.0	56.2	14.9	2.8	0.9
All occupations	708.0	96.0	88.9	69.8	24.2	7.2	2.1
Air Force enlisted educational distribution (first-term)							
0 Infantry, gun crew	8.7			97.8	19.8		
1 Electronic equipment repair	101.8			98.9	20.2		
2 Communications and intelligence	47.3			99.5	24.1		
3 Medicine, dentistry	21.5			97.4	21.8		
4 Other technical and allied specialties	19.0			98.7	32.8		
5 Administrative and clerical specialties	161.7			97.8	21.2		
6 Electrical/mechanical equipment repair	193.5			96.5	7.0		
7 Crafts	49.3			94.6	6.8		
8 Service and supply	106.0			95.2	8.9		
All occupations	708.8			97.1	14.8		

Source: Roaume and Oi, op. cit. (see Table 8).

IV. THE INSTITUTIONS PROVIDING VOCATIONAL EDUCATION: THE PUBLIC SCHOOL SYSTEM

The discussion of how the public schools are currently providing vocational education will be in terms of the resources required to provide target groups with occupational training, i.e., it will be in terms of the elements of the vocational education process — enrollees, faculty, and plant and equipment. Viewing the vocational education process as a production process, the major thrust of this section is to identify the different types of raw material (target populations) and the different qualities of labor (faculties) and capital (plant and equipment) available. The section will close with a summary of the data required to accurately portray the program so that it can be more completely understood, and hence reconstituted to better achieve its objectives.

TARGET POPULATIONS OF VOCATIONAL EDUCATION

Of the several standard myths about vocational education target populations, two are perhaps most widely circulated:

- "Vocational education is for somebody else's children."
- Vocational education has as its basic orientation the training of youth from the lower socio-economic levels so that they can earn a living upon graduation from high school.

The subsequent discussion will provide data that appear to at least reduce the credibility of these assertions, if not destroy them.

Family Incomes

The results of a recent USOE survey, "Vocational Education: Characteristics of Teachers and Students, 1969,"[1] provided the basic material for this discussion. The survey covered the District of Columbia and 47 States (returns not received from New York, Illinois, and Indiana). In addition to the material on secondary vocational education, partially complete returns provide information on post-secondary and adult patterns. However, only the secondary results were treated in the published report.

Table 13 gives estimated breakdowns of family incomes of vocational education students. The original data consisted of column percentages by school level. Using data on enrollments for FY 1969, it was possible to estimate row entries for number of students and hence provide information on family income stratifications. Table 14 permits family incomes for the general population to be compared with estimated family incomes for vocational education students. The distributions show a heavier concentration of vocational education families in the $3,000-$10,000 income range, and fewer with incomes above $10,000.

Ethnic Groups

The NCES data also include an unusually comprehensive breakdown on the ethnic characteristics of vocational education students.[2] Estimates of numbers of students belonging to the various ethnic groups appear in Table 15. These estimates were obtained in a fashion similar to that described in "Family Incomes," above. The table reveals that the ethnic composition of the program enrollees approximates the ethnic composition of the total national population. Table 16 shows the representation of whites and nonwhites in secondary and post-secondary public school vocational education programs.

Demographic Factors

The material in Tables 14, 15, and 16 suggests that public school vocational education students come from the population at large, rather than from any specific socioeconomic concentration. State-by-State comparisons of vocational education enrollments with populations in two age groups further indicate that this condition persists relatively independent of geographic considerations.

1/ Prepared by the National Center for Educational Statistics.

2/ No information on adult enrollments was available.

TABLE 13.— Estimated numbers of vocational education students with given family incomes, FY 1969

Family income, $	Vocational education students						
	Secondary		Post-secondary		Adult		Total
	Number (000)	% of total	Number (000)	% of total	Number (000)	% of total	
Under 3,000. . . .	330	8.1	52	7.4	332	10.9	714
3,000-5,000 . . .	865	21.2	138	19.6	711	23.3	1,714
6,000-9,999 . . .	1,456	35.7	247	35.0	1,095	35.9	2,798
10,000 and over	1,428	35.0	268	38.0	912	29.9	2,608
Total[1/] . . .	4,079		706		3,050		7,835

1/ Due to rounding, the sum of post-secondary students from each income bracket does not exactly equal the total.

Sources: Enrollments—from USOE, "Summary Data on Vocational Education, Fiscal Year 1969," April 1970.

Percentages of students having given family incomes—from survey made by NCES, Adult and Vocational Surveys Branch. Returns amounted to 71 percent for secondary, 57 percent for post-secondary, 34 percent for adult schools. Figures for post-secondary and adult levels accordingly do not have the stability of the secondary data.

TABLE 14.—Comparison of family incomes for general population and vocational education students, FY 1969

Family income, $	General pop., %[1]		Voc ed. students, %[2]	
Under 3,000 . . .	9.3		9.1	
3,000-5,999 . . .	16.6		21.9	
6,000-9,999 . . .	28.1	73.0	35.8	69.2
10,000 and over	45.9		33.4	

[1] Based on Census Bureau data.

[2] NCES data; see Table 13.

TABLE 15.—Estimated numbers of vocational education students from various ethnic groups, FY 1969

Ethnic group	Number of students (000)				
	Secondary		Post-secondary		Total
	No.	% of total	No.	% of total	
Am. Indian. .	106	2.6	11	1.5	117
Negro . . .	564	13.8	38	5.4	602
Oriental. . .	20	0.5	17	2.4	37
Spanish surname . .	151	3.7	20	2.9	171
All other . .	3,243	79.5	619	87.7	3,862
Total[1]. .	4,079		706		4,785

[1] Due to rounding, the sums of secondary and post-secondary students do not equal the totals for the two levels exactly.

Sources: Enrollments—from USOE, "Summary Data on Vocational Education, Fiscal Year 1969," April 1970. Data for FY 1969.

Percentages of students from various ethnic groups—from survey made by NCES, Adult and Vocational Surveys Branch. Returns amounted to 71 percent for secondary, 57 percent for post-secondary. Figures for post-secondary accordingly do not have the stability of the secondary data.

TABLE 16.—Comparison of white and nonwhite students in the general population and vocational education, FY 1969

(Percent of total)

Ethnic category	Secondary voc ed.	Post-secondary voc ed.	General population[1/]
White	79.5	87.7	86.2
Nonwhite. . .	20.5	12.3	13.8

1/ From Bureau of the Census, Series P-25, No. 381. This makes use of Series D projections.

Figures 1 (for FY 1965) and 2 (for FY 1969) show the results for secondary enrollments compared with Census Series II-D data for the 15- to 17-year age group. The degree of correlation increased from FY 1965 to FY 1969, with the points extending across three logarithmic cycles. We have drawn a straight line with a slope of +1 through the data points to aid the reader. In Figure 2, only the Rhode Island and the District of Columbia points seem to depart in any major way from the other data. Figure 2 suggests that secondary enrollments in vocational education programs seem deficient in Rhode Island and the District of Columbia by some 10,000 students. Despite these two divergent points, the overall trend seems quite clear: vocational education enrollments at the secondary level run directly proportional to the first power of the State populations falling into the school age years of 5-17.

Figures 3 and 4 treat the post-secondary level for FY 1965 and FY 1969, respectively, comparing vocational education enrollments with Census Series II-D data for the 18- to 24-year age group. The overall trends seem quite similar to those shown in Figures 1 and 2.

Projected Vocational Education Enrollments: 1975 and 1980

In an effort to obtain a better understanding of enrollments in vocational education programs in the 1975 and 1980 eras, we have applied the demographic material presented above. Table 17 shows the recent proportions of vocational education students enrolled in public schools at the three levels. The table suggests that post-secondary enrollments amount to, at most, about 10 percent of the combined secondary and adult enrollments. Accordingly, the following three relationships comprised the basis for the projections:

- Secondary enrollment = .07 population (5-17)
- Adult enrollment = .10 population (18-24)
- Post secondary enrollment = .10 of secondary + adult.

By using Census Bureau projections for State populations in the two age groups 5-17 and 18-24, one can use the relations stated above to estimate enrollments. The results appear in Table 18, which gives the overall picture. Since this analysis was made on a State-by-State basis, we can identify States in which one can anticipate significant changes to be brought about by shifts in population and expected variations in fertility. Table 19 shows a comparison of total FY 1969 enrollments with those projected for 1975. Table 20 contains an analogous comparison for 1975 and 1980.

Discrepancies in Projections

Let us now compare the projections just presented with other projected educational statistics. Tables 21 and 22 provide comparisons of recent and projected vocational education enrollments with the total public enrollments in secondary and 2-year post-secondary institutions, respectively. In both instances

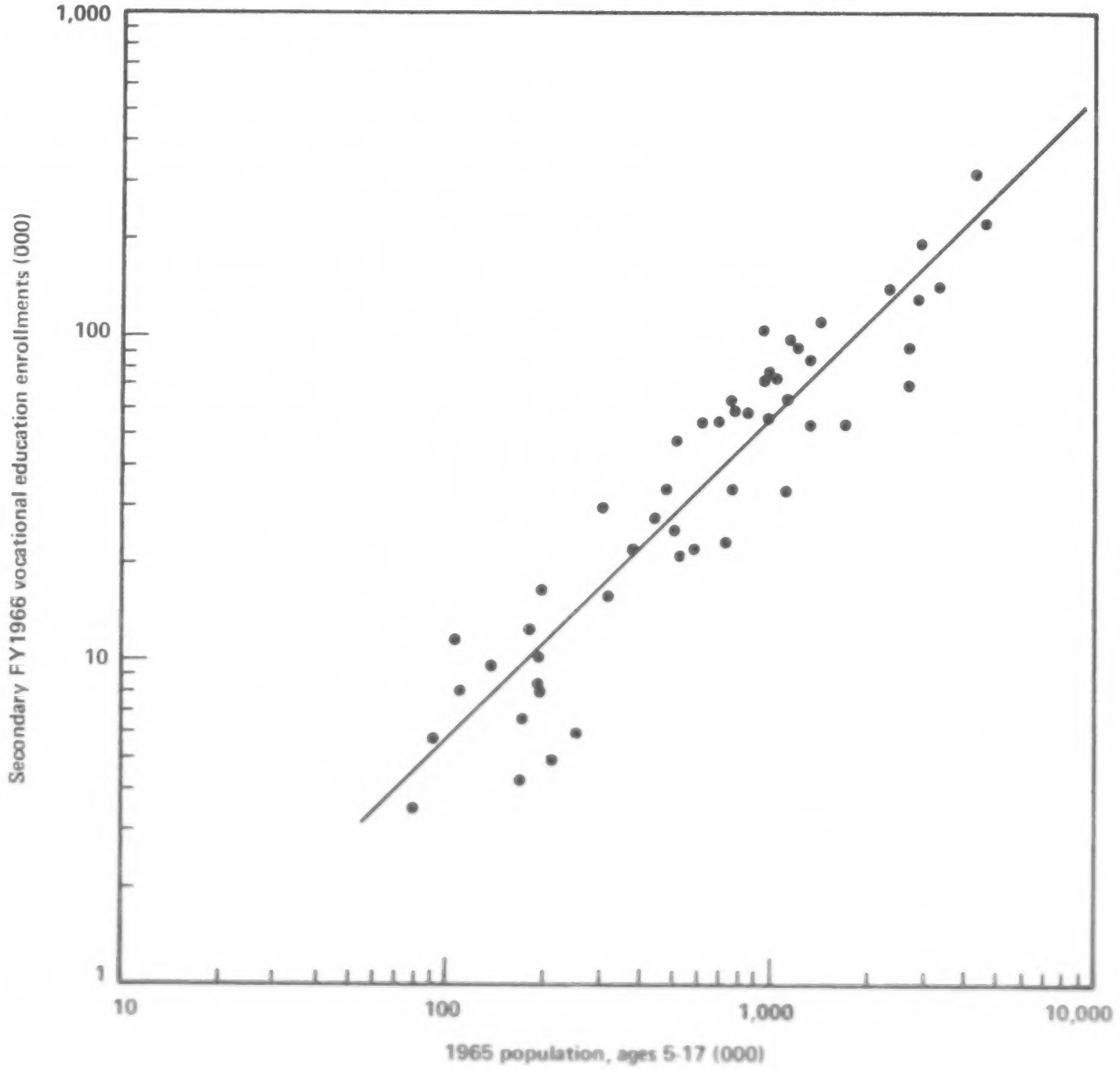

Figure 1.—Secondary vocational education enrollment and population, by State, FY 1966.

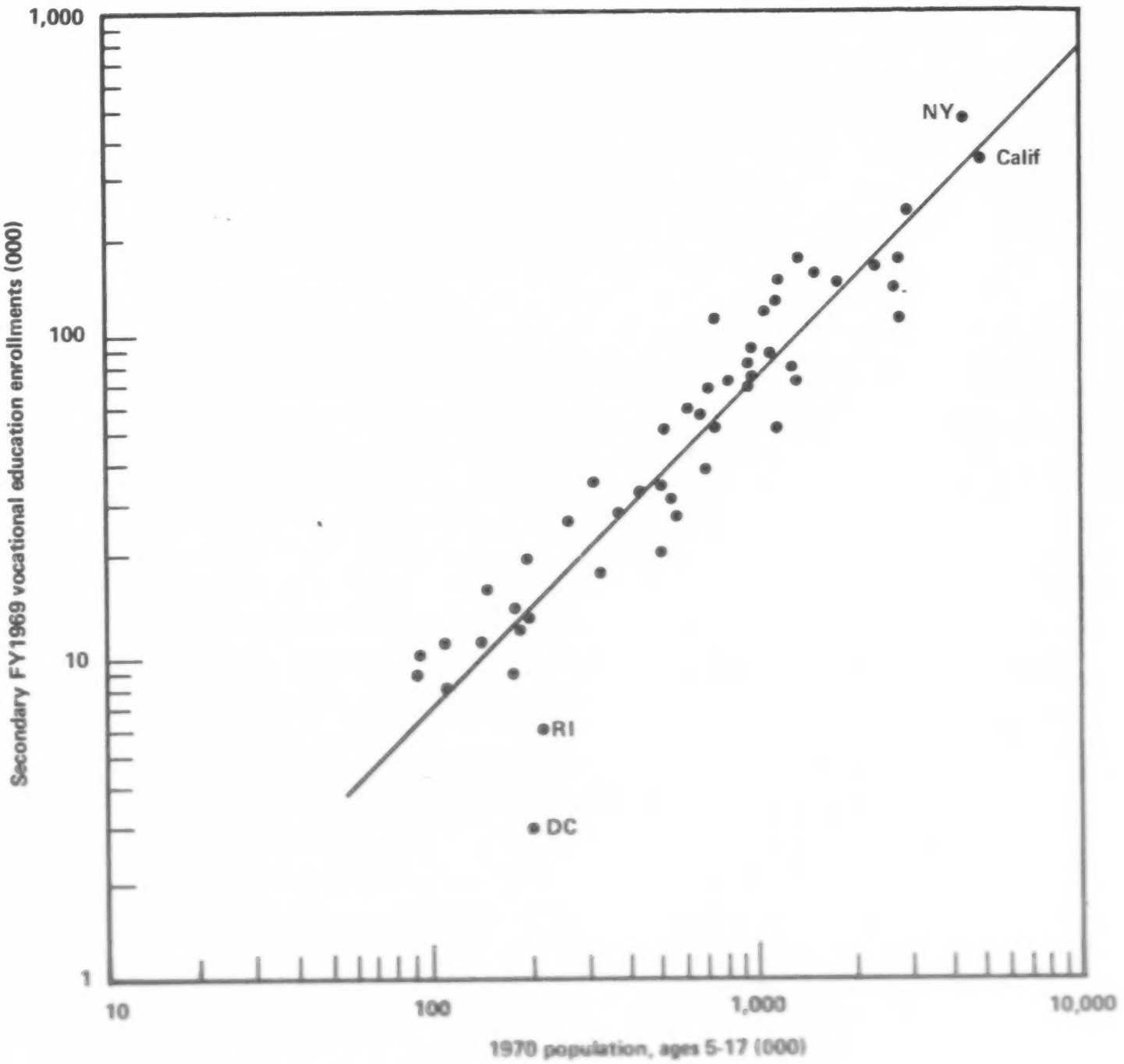

Figure 2.—Secondary vocational education enrollment and population, by State, FY 1969.

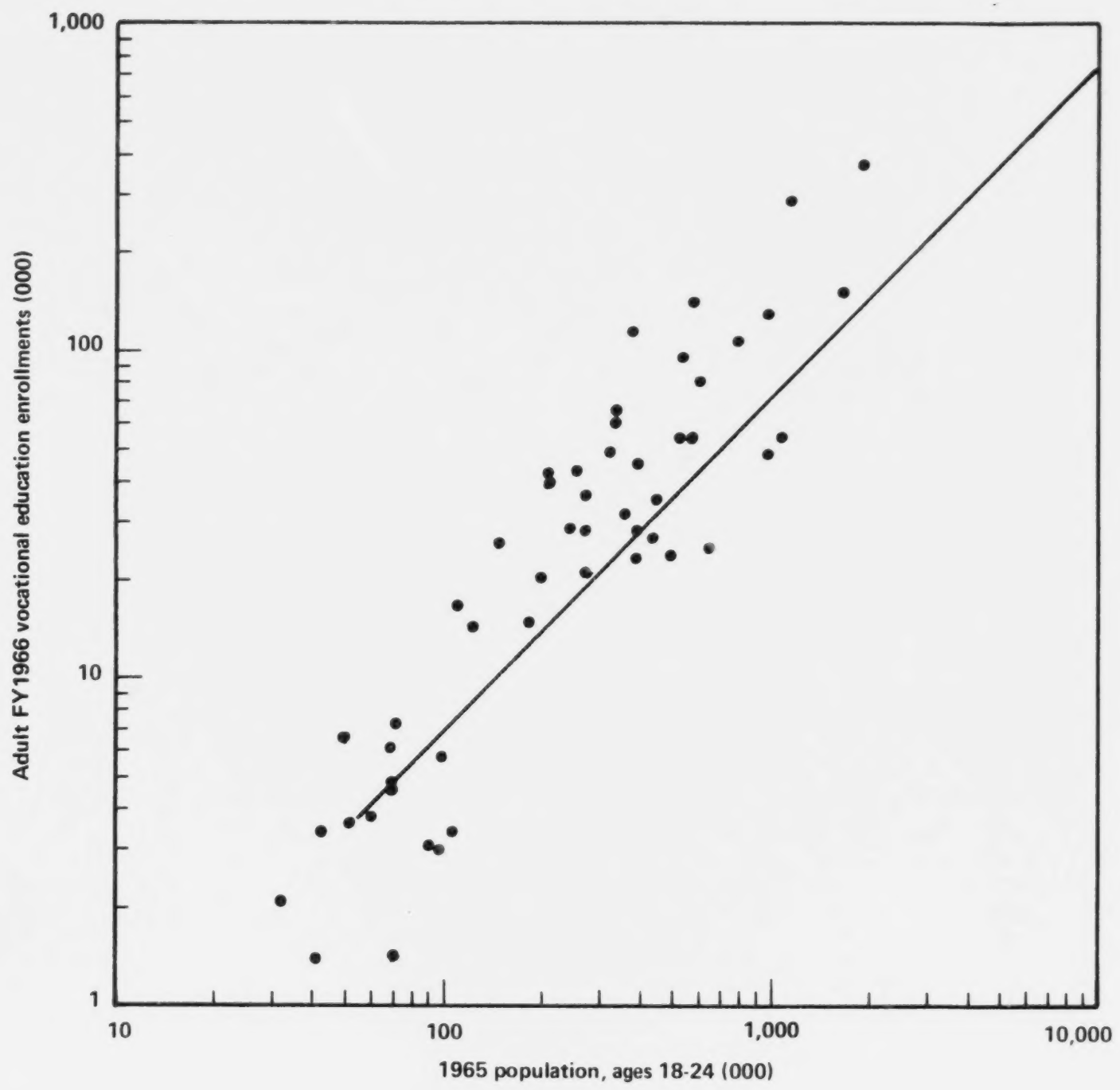

Figure 3.—Adult vocational education enrollment and population, by State, FY 1966.

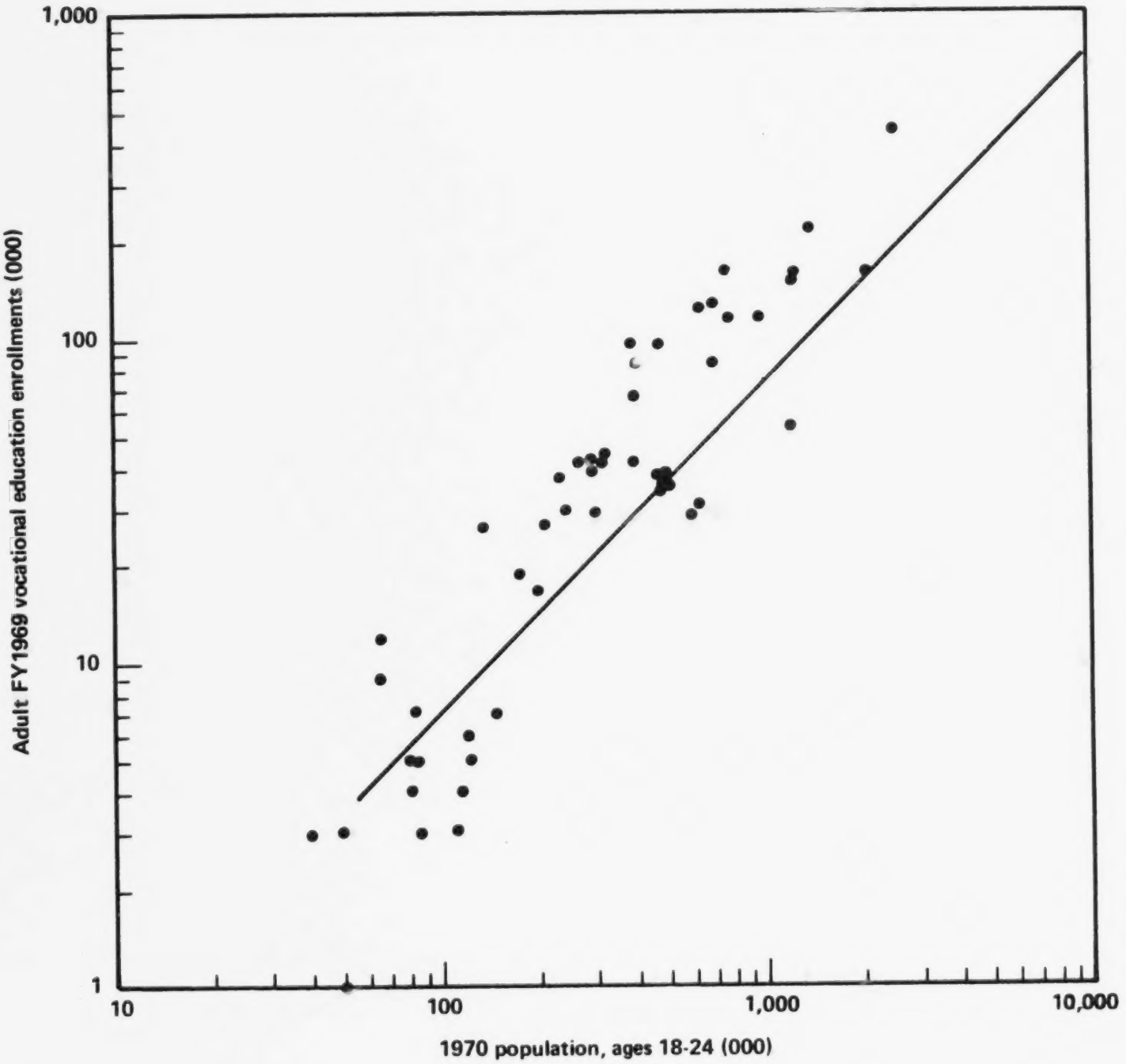

Figure 4.—Adult vocational education enrollment and population, by State, FY 1969.

TABLE 17.—Vocational education enrollments by instructional level, FY 1966-FY 1969

Instructional level	1966		1967		1968		1969	
	Number (000)	% of total	Number (000)	% of total	Number (000)	% of total	Number (000)	% of total
Secondary. .	3,048	50.6	3,533	50.6	3,843	51.8	4,079	52.1
Post-sec. . . .	442	7.4	500	7.2	593	8.0	706	9.0
Adult. . . .	2,531	42.0	2,941	42.2	2,987	40.2	3,050	38.9
Total. . .	6 021		6,974		7,423		7,835	

TABLE 18.— Projected vocational education enrollments for 1975 and 1980
(000)

Level	1975	1980
Secondary	3,578.3	3,413.1
Post-secondary . . .	625.9	629.4
Adult	2,677.3	2,885.7
Total . . .	6,881.5	6,928.2

TABLE 19.—Comparison of FY 1969 vocational education enrollments with projections for 1975, by State[1/]

Same ± 10,000	Increase by more than 10,000	Decrease by more than 10,000
Maine	Massachusetts	New York
New Hampshire	Rhode Island	New Jersey
Vermont	Pennsylvania	Wisconsin
Connecticut	Ohio	Minnesota
Michigan	Indiana	Virginia
Iowa	Illinois	North Carolina
North Dakota	Missouri	South Carolina
South Dakota	Maryland	Georgia
Nebraska	District of Columbia	Florida
Kansas		Kentucky
Delaware		Mississippi
West Virginia		Arkansas
Tennessee		Louisiana
Alabama		Texas
Oklahoma		California
Montana		Utah
Idaho		Washington
Wyoming		
New Mexico		
Arizona		
Nevada		
Oregon		
Colorado		
Alaska		
Hawaii		

[1/] Secondary, post-secondary, and adult programs only.

TABLE 20.—Comparison of projected vocational education enrollments for 1975 with 1980, by State

Same + 10,000	Increase by more than 10,000	Decrease by more than 10,000
All other states	Florida (>14,300)	Pennsylvania (<10,800)
	California (>41,900)	

TABLE 21.—Comparison of two projections of various secondary level public school populations
(000)

Year (fall)	VE sec enroll.[1]	Total public enroll., grades 9-12[2]	VE fraction of total public enroll., grades 9-12, %
1965	3,048	11,610	26.3
1966	3,533	11,894	29.8
1967	3,843	12,247	31.4
1968	4,079	12,700	32.1
1975	3,578[3]	15,000	23.6
1980	3,413[3]	19,000(1977)	22.5

[1] USOE, Vocational and Technical Education Annual Report, 1966-1969.

[2] USOE, Projections of Educational Statistics to 1977-78, 1968 edition, OE-10030-68, Table 2.

[3] Projections as given in Table 18, above.

TABLE 22.— Comparison of two projections of various post-secondary level public school populations
(000)

Year (fall)	VE post-sec enroll.[1]	Total degree credit enroll., 2-yr inst[2]	Post-sec VE fraction of 2-yr inst total enroll., %
1965 . . .	442	841	52.6%
1966 . . .	500	945	53.0
1967 . . .	593	1,075	55.1
1968 . . .	706	1,164	60.6
1975 . . .	626[3]	1,705	36.7
1980 . . .	629[3]	1,859 (1977)	33.8

[1] USOE, Vocational and Technical Education Annual Report, 1966-1969.

[2] USOE, Projections of Educational Statistics to 1977-78, 1968 edition, OE-10030-68, Table 10.

[3] Projections from Table 18.

those making projections for total public enrollments have expected increasing numbers of students for 1975 and 1980, while the Census projections (and hence the numbers developed herein) do not indicate this as reasonable.

In the case of comparative secondary enrollments, one can see in Table 21 a gradual growth in the vocational education fraction of students from 26 percent to 32 percent. The Office of Education projections of total public secondary enrollment suggest that the vocational education enrollments will decline to some 23 percent to 22 percent of the public secondary enrollment. However, if our projections turn out more valid than the others, and if the vocational education fraction stays near the level of 33 percent of the total secondary enrollment, then the public schools will have closer to 11 million students in 1975 rather than 15.1 million, and closer to 10 million in 1980 rather than 15.2 million. These discrepancies seem quite large, implying a significantly different size of teaching staff, facilities, and supporting services.

Similar discrepancies exist in the two projections for the post-secondary level, as given in Table 22. One might reasonably wonder if the projections summarized in Table 18 significantly underestimate the future vocational education population. If the overall structure of those teaching, recruiting for, and taking courses in vocational education remains essentially the same, then these estimates seem sound. Table 23 shows a percentage comparison of vocational education enrollments with the appropriate age groups of the U.S. population. The calculated numbers for 1975 and 1980 show the percentage of public vocational education enrollees rising slightly, rather than dropping (which would obviously indicate underestimates of the numbers of enrollees).

Trends Within Programs, by States

Table 24 shows a comparison of the percentages of public vocational education enrollments distributed among the eight occupational categories. State-by-State comparisons for FY 1965 and FY 1969 enrollments appear in Figures 5 through 11.

Perhaps the most interesting changes took place on a State-by-State basis in agriculture and office occupations. Overall, the trends from 1965 to 1969 reflect the change from an earlier emphasis on agriculture and home economics to increased emphasis on distributive education and office occupations. It is also noteworthy that in several of the categories the returns for New York, New Jersey, and Maryland seem rather out of line with patterns in the other States.

VOCATIONAL EDUCATION FACULTIES, AND PLANT AND EQUIPMENT

During the period 1965-1969 there was considerable growth in the number of vocational education teachers, the number of facilities, and the stock of vocational education equipment. This growth reflects the new emphasis of the American public school system on providing adequate education for the great majority of American citizens who do not complete 4-year college courses but who fill the majority of jobs in the national economy.

TABLE 23.— Vocational education enrollments and population
(000)

Fiscal year	Total VE enrollments	U.S. population			
		5-17 yr	18-24 yr	5-24 yr	% of total
1965. . .	5,431	49,999	19,758	69,757	7.7
1966. . .	6,070				
1967. . .	7,048				
1968. . .	7,534				
1969. . .	7,979	53,026	24,015	77,041	7.0
1975. . .	6,882(est)	51,099	26,962	78,061	8.8
1980. . .	6,928(est)	48,694	29,038	77,732	8.9

Sources: Vocational education enrollments—from USOE, Vocational and Technical Education, Annual Report, 1965-1969. 1975 and 1980 enrollments estimated on the basis of projections given in Table 18, above.

Population figures—from Series II-D material in Bureau of the Census, Revised Projection of the Population of States, 1970 to 1985, Series P-25, No. 375, 3 October 1967.

TABLE 24.—Percentage enrollments in eight vocational program categories

Occupational category	Percent enrolled	
	FY 1965	FY 1969
Agriculture	16.3	10.7
Distribution	6.1	7.0
Health	1.2	2.2
Home economics	38.7	30.7
Office	13.4	23.0
Technical	4.2	4.0
Trades and industry	20.1	21.5
Other[1]	-	0.9
Total	100.0	100.0

[1] No breakdown for "Other" appears for 1965.

Source: USOE, Vocational and Technical Education, Annual Report, 1965, 1969.

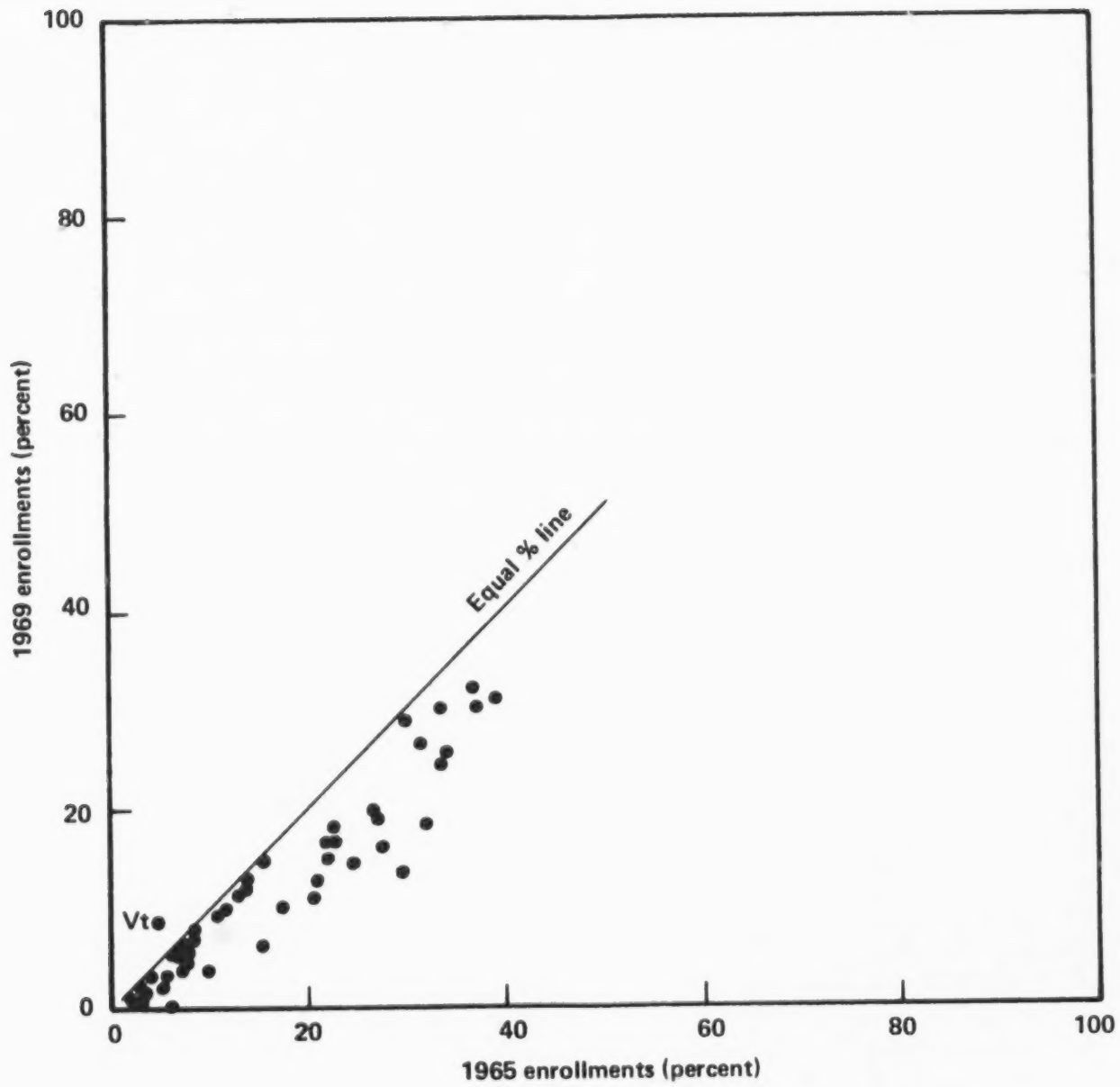

Figure 5.— Changes in agriculture enrollments, by State.

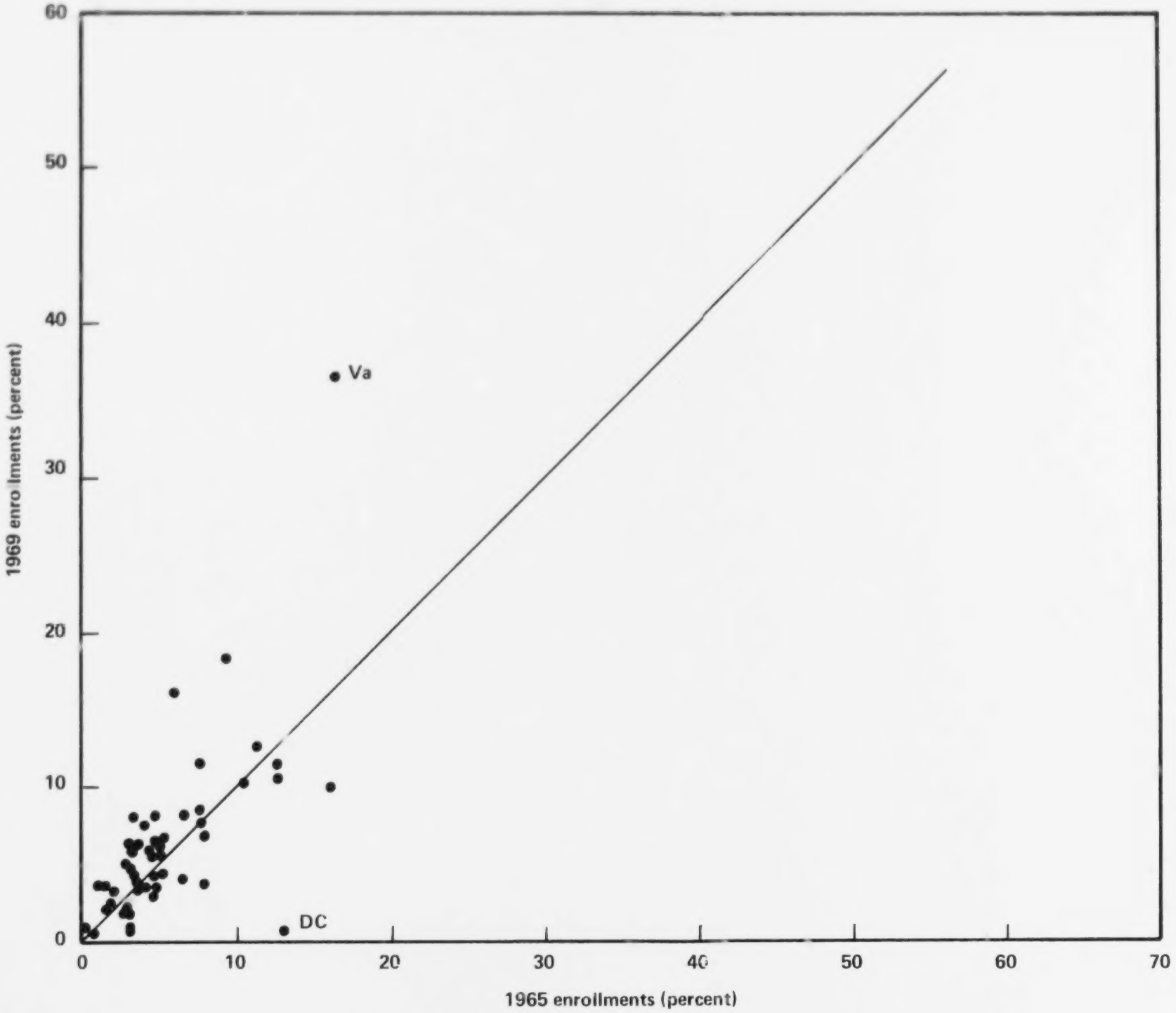

Figure 6.—Changes in distributive education enrollments, by State.

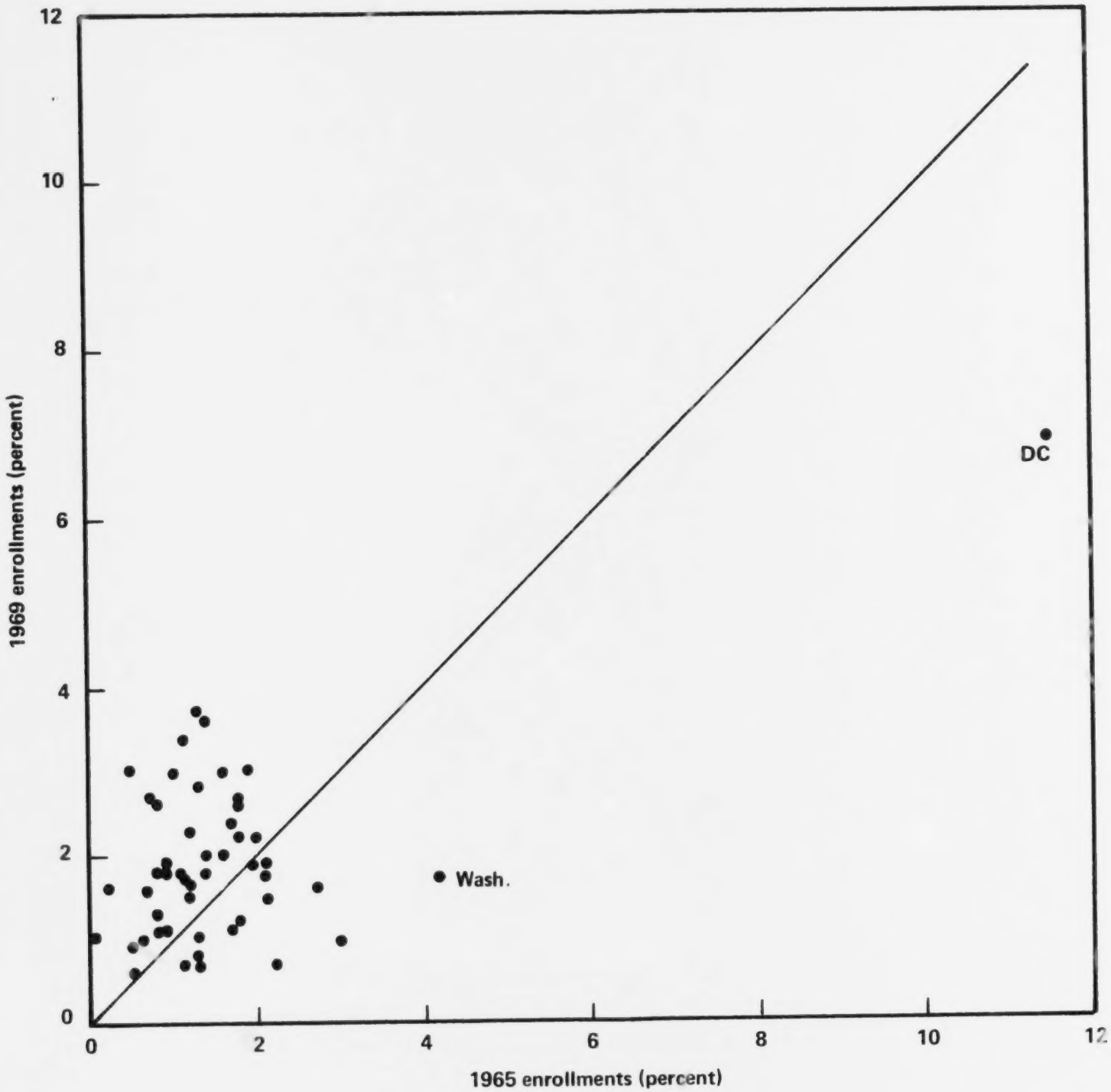

Figure 7.—Changes in health occupations enrollments, by State.

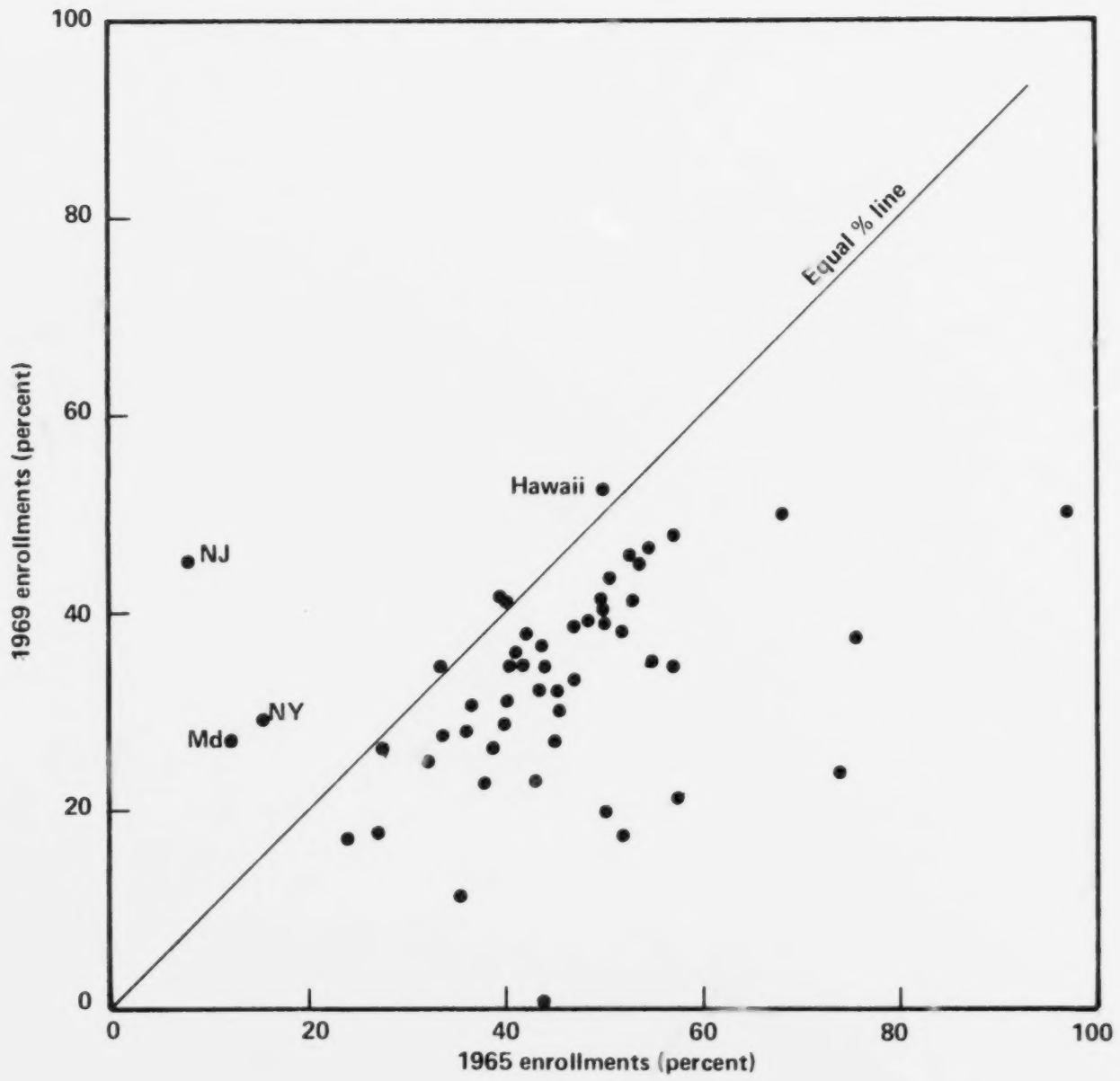

Figure 8.—Changes in home economics enrollments, by State.

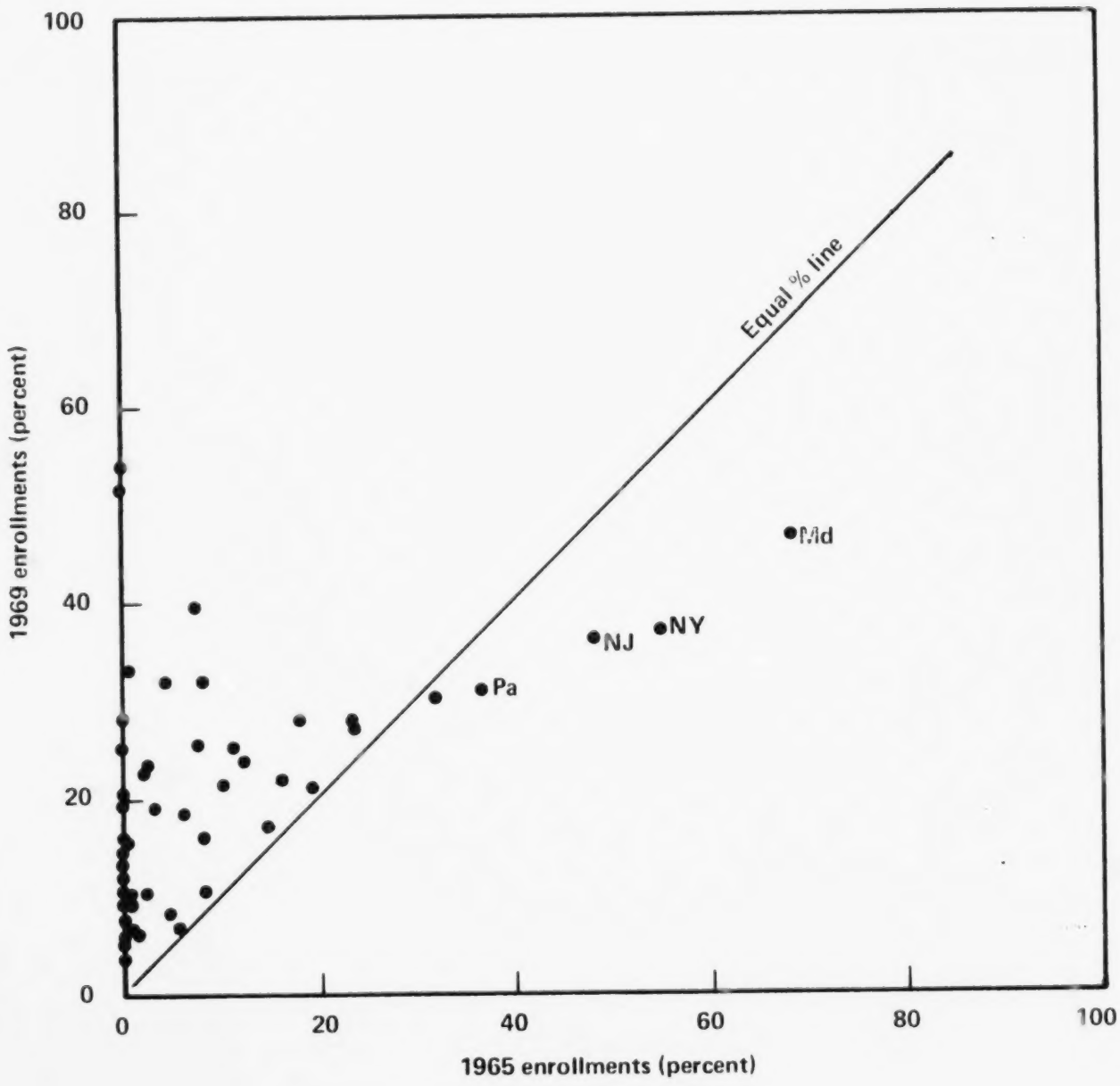

Figure 9. —Changes in office occupations enrollments, by State.

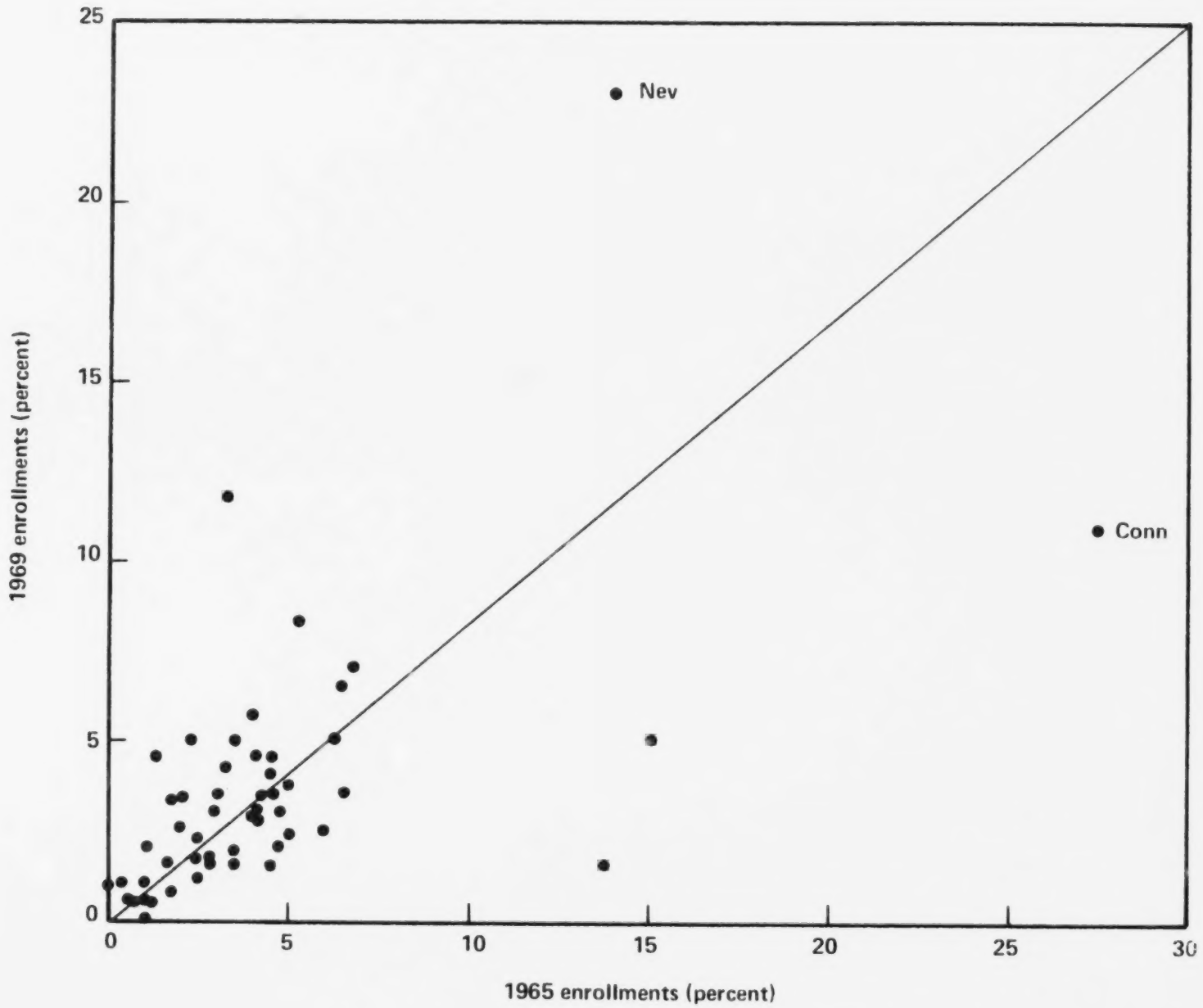

Figure 10.—Changes in technical enrollments, by State.

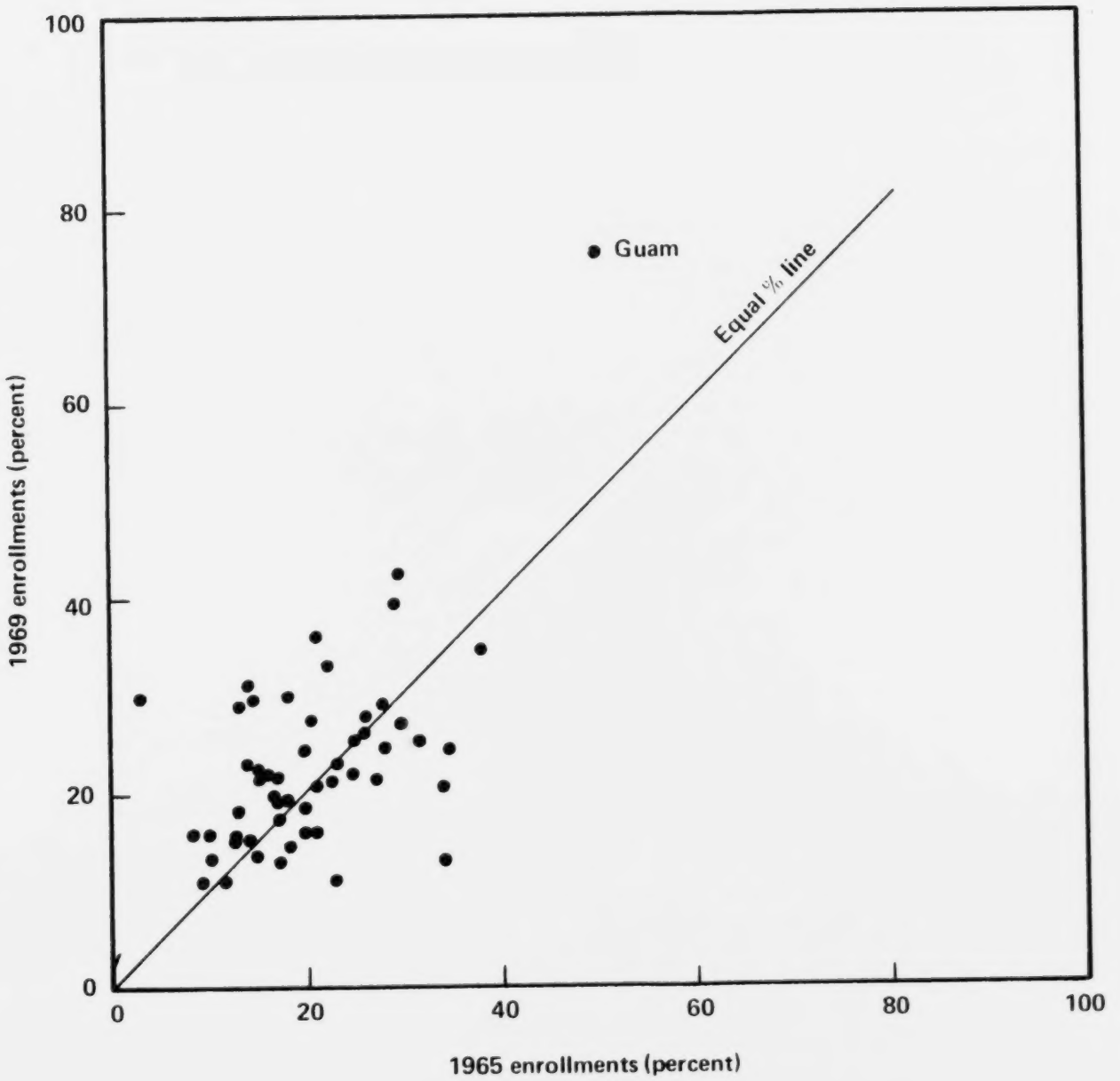

Figure 11.—Changes in trades and industry enrollments, by State.

The advancements in vocational education, furthermore, recognize the special needs of certain members of the society. Since the enactment of the Vocational Education Amendments of 1968, the local school systems, with State and Federal assistance, have made greater efforts to reach the urban poor. In a growing number of rural areas, when low population density precludes the institution of expensive vocational education programs, construction of centrally located area vocational-technical schools has enabled school systems to serve with a single facility the vocational education needs of several communities.

Teachers

As is clear from Table 25, the increases in the numbers of vocational education teachers since 1965 have paralleled the manpower demands of the national economy.3/ In response to the health services shortage throughout the nation, there are now over two and one-half times as many teachers in the health vocational education category as there were in 1965. An increase of similar magnitude is apparent in the number of teachers providing training in office occupations. The increases in specific program areas, of course, mirror the general expansion of vocational education as educators at all levels of government have recognized the needs of the students and the opportunities within the expanding economy.

The growth in the numbers of vocational teachers in the several levels of vocational programs also reflects shifts in the focus of American society. Table 26 shows post-secondary staffs increasing at a much more rapid rate than secondary or adult staffs. This is primarily attributable to the recent emphasis on development of community and junior colleges. The 50 percent decline in full-time adult vocational education teachers is probably the result of large numbers of former adult education teachers transferring to MDTA or other training programs and to secondary and post-secondary schools. The data do not allow complete analysis of this phenomenon, and it should be more fully explored because it is in adult education that vocational programs may directly compete with manpower programs. Further, it is the adult programs that will most directly serve the blue-collar workers in the $3,000-$10,000 income range.

The most striking change is the greater than fivefold increase in the number of teachers for persons with special needs. Although growth in this area took place throughout the past decade, the most notable increase occurred following the Vocational Education Amendments of 1968. That legislation specifically prescribed special attention to the needs of disadvantaged persons—those with physical handicaps or with academic, socioeconomic, or other handicaps that prevent their success in the regular vocational education program.

3/ Table 27 provides the data on teachers for all years 1965-1969.

TABLE 25. — Number of vocational education teachers by occupational category, 1965 and 1969

Occupational category	Number of teachers			
	1965	1969	Change	% Change
Agriculture	17,608	12,565	-5,043	-29
Distribution	7,200	9,741	2,541	+35
Health	3,429	8,876	5,447	+159
Home economics	31,243	31,845	602	+2
Office	15,850	37,923	22,073	+139
Technical	9,213	13,488	4,275	+46
Trades and industry	39,804	50,592	10,788	+27
Other	2,335	2,087	-248	-11
Total	109,136	166,898	57,762	+53

Source: USOE, Vocational and Technical Education, Annual Report, 1965-1969.

TABLE 26.— Number of vocational education teachers by level of program, full- and part-time, 1965 and 1969

Program level	Number of teachers			
	1965	1969	Change	% Change
SECONDARY				
Full-time.	41,366	64,614	23,248	56
Part-time.	13,382	19,631	6,249	47
POST-SECONDARY				
Full-time.	6,963	22,234	15,271	219
Part-time.	6,620	14,373	7,753	117
ADULT				
Full-time.	4,973	2,477	-2,496	-50
Part-time.				
Who are also secondary teachers . .	14,836	18,487	3,651	25
Who are also post-secondary teachers . .	5,021	5,615	594	12
Who are from business and industry	29,218	38,855	9,637	33
Total (part-time) . .	49,075	62,957	13,882	28
SPECIAL NEEDS				
Full-time.	346	2,122	1,776	513
Part-time.	756	4,784	4,028	533
Total, all levels . .	109,136	166,898	57,762	53

Source: USOE, Vocational and Technical Education, Annual Report, 1965-1969.

TABLE 27.—Number of teachers by occupational category, 1965-1967

Occupational category	1965[1]	1966	1967	1968	1969
Agriculture	17,608	11,765[2]	11,849	12,262	13,565
Distribution	7,200	7,636	7,523	8,542	9,741
Health	3,429	3,652	5,153	6,521	8,876
Home economics	31,243	25,943[3]	27,744	29,402	31,845
Office	15,850	23,111	29,431	31,428	37,923
Technical	9,213	8,399	9,637	10,276	13,488
Trades and industry . . .	39,804	38,736	40,248	47,742	50,592
Other	2,335	4,800	996	892	2,087
Total	109,136	124,042	132,581	146,552	166,898

1/ Occupational categories include some duplications.

2/ Decline in agricultural teachers figure is partially attributable to reclassification of some agriculture teachers as trades and industry instructors.

3/ Decline in home economics teachers is partially attributable to reclassification of some home economics instructors as office instructors.

By 1969, three of every four vocational education teachers had at least a bachelor's degree, and one of every three had at least a master's degree. One result of the rapid expansion of the vocational education program, however, is that over three-fifths of all vocational education teachers have fewer than 10 years of teaching experience, in vocational or other subjects. This expansion has been faster than in other areas of education. In order to maintain and improve the quality of vocational teaching and to satisfy the growing demand for vocational education, the Vocational Education Amendments of 1968 provided the States with funds for training and development programs for vocational education personnel. A factor not tabulated in the national statistics on the characteristics of the vocational teachers is their work experience. In vocational education, the length and quality of work experience may be more useful than teaching experience or academic degree as an indicator of teacher quality.

An increasing number of very important "teachers" of vocational education have not been counted because they are not employees of government. These are the men and women who work in private businesses that participate in cooperative vocational education programs. These private employees provide meaningful on-the-job training and guidance to students who spend part of the day in school and part in gainful employment. The cooperative arrangement removes the artificial barrier between education and employment, and exposes problems and needs of industry in its interactions with the vocational education program. Through utilization of private production facilities, the cooperative program obviates some of the necessity for large public expenditures for vocational equipment and physical plant. Since 1968, the cooperative programs have created growing interest among business and education officials nationwide. At this time, however, no complete quantitative measures of the extent of the program are available.

This lack of data in the cooperative area is a glaring weakness that must be remedied. If the vocational program expects to continue or expand the cooperative activities, there is an urgent need for information about the "facilities" of the business training programs, especially for assessing the effectiveness of these programs. Against this need for data must be balanced the convenience of industry, on whose goodwill the cooperative program is based. There is also a strong second need for data concerning all business sector training programs, an area where the data are currently available only upon special request and on a firm-by-firm basis. These business sector programs may produce such a large number of graduates that they are competing directly with public vocational education.

Facilities

There has also been dramatic improvement and extension of facilities for vocational education since 1965. Table 28 shows changes in the level of expenditures for facilities during the period and the contributions made by each level of government.

TABLE 28.—Expenditures for vocational-technical education facilities, by source, FY 1965 and 1969

Source	Millions of dollars			
	1965	1969	Change	% Change
Federal funds . . .	42.7	107.4	64.7	152
State matching . .	16.1	86.0	69.9	434
Local matching . .	48.9	114.1	65.2	133
Total . .	107.7	307.5	199.8	186

Source: USOE, "Annual Report on Facilities," 1965-1969, unpublished papers of Bureau of Adult, Vocational and Technical Education, Division of Vocational and Technical Education. Includes funds from EDA and Appalachian Regional Commission.

Between 300 and 400 construction projects for vocational education were funded in each year during the period. Of primary importance among these projects was construction of area vocational-technical schools. In 1965, there were 405 of these schools nationwide; by 1969, 1,296 area schools were operating. This represents a growth of 220 percent.[4] Under current conditions, these area vocational-technical centers are in some ways highly desirable from the viewpoint of both educators and students. In rural areas, these large centers can usually serve several small communities, each of which lacks the tax base to support separate vocational programs, especially during a period of increasing construction costs. Central location among communities also makes it easier for more people to use the training facilities, each of which is intend to serve three "shifts" of students per day, usually from 8:00 a.m. to 10:00 p.m. Furthermore, the new schools are very attractive to the students, and their physical aspects tend to improve the "image of vocational education in the community.

Despite the growth in facilities, increases in enrollment have resulted in an estimated 437,000 youths and adults being denied an adequate opportunity to receive quality vocational training.[5] Enrollments, moreover, are increasing at a rate of 900,000 to 1,000,000 per year. At the same time, construction of facilities and installation of equipment is serving only an additional 180,000 to 200,000 students per year.

4/ Most of this growth is due to construction. Some, however, occurred as the result of a change in school status as vocational offerings were increased without the need for construction.

5/ This estimate, prepared by USOE, is based on the following assumptions: the ratio of students desiring vocational education to the total number of students, has remained the same over the past 5 years. Obviously, this ratio does not include those who drop out before they enter the "universe" of all students. To this extent, at least, the estimate is low. It should also be noted that the estimate does not imply that this large number of citizens was turned away by schools. Rather, the school systems failed to provide opportunities for that many people who need more occupational training.

V. INSTITUTIONAL FACTORS INFLUENCING VOCATIONAL EDUCATION

INTRODUCTION

This section attempts to provide an overview of the various institutions, outside those which actually provide the instruction, that influence or fail to influence the vocational education system in the United States. It is admittedly incomplete and time did not permit necessary cross-references in many cases, but some attention was given to almost every significant institution. In treating each, effort was made to reflect the clear mandate for change intended by the vocational education statute.

SUMMARY

In general, there is little to argue for significant modifications in the statute from the standpoint of institutions and their impact on the program. Moreover, the Federal and State administrators have had little time to implement the 1968 amendments. A great many steps might be taken administratively within that statute, however, to improve the effectiveness and responsiveness of the program. Among these steps would be to:

- Maintain the strength of the National Advisory Council and further broadening its membership. Assure that it has a leading role in assessing the work of the State councils.
- Put the entire vocational education system into a new "Cooperative Area Manpower Planning System" (CAMPS), as recommended by the National Council, and begin experimenting with different administrative arrangements by which a greater degree of

authority can be exercised in communities. Make an effort to bring the mayors and city managers as well as the governors more directly into the program.

- Launch an intensive and extensive training program to include State advisory councils, State boards of vocational education, State vocational education administrators, local CAMPS planners, new vocational education institutions, State employment service officials, etc., to assure their understanding of their own and others' roles in a broadened vocational education system. Invest particularly heavily in training where interagency cooperation is necessary for delivery of the comprehensive services required to help disadvantaged students.

- Survey the students in vocational education, the dropouts and the graduates, to improve understanding at all levels of the views and needs of students.

- Similarly, study the real hiring practices of employers as a means of redirecting (where necessary) curricula and systems. Determine the actual limitations imposed by State and Federal child labor laws and act to eliminate false impressions of limitations where these are impediments.

- Press State and Federal agencies to use the special categories of funds for disadvantaged persons to bring new institutions into the system and to experiment with agencies normally considered outside the system, e.g., private vocational schools, community colleges, etc.

- Examine the implementation of the public hearing requirements to assure full and free presentations and effective follow-up.

REVIEW OF INSTITUTIONS

National Advisory Council on Vocational Education

In the National Advisory Council, the vocational education program has had for the past year-and-a-half what appears to be one of the most active and involved institutions of its kind in the Federal establishment. It has received considerable attention from the press and has been cited by Education Daily and others for its "blunt, candid, seminal policy recommendations." Because of its reputation for real input in the field of vocational education,

the Council deserves more than the cursory glance normally warranted by such bodies.

As a body, it meets every 6 weeks; its committees are said to be in a continuous state of activity. The chairman testifies before Congress independently of HEW. Its staff is under contract and free of some of the pressures and selection factors that would otherwise tend to make the Council a captive of the bureaucracy. It hires experts without civil service processing to make whatever examinations it chooses and it prepares reports which are said to be widely sought after and reprinted. There is evidence that its recommendations are at least in some measure taken to heart by the Bureau of Adult Vocational and Technical Education (BAVTE) in setting priorities. The testimony on these matters is at this point without verification, however.

Because the Council is intended to be an influential body, it is important to examine its composition. The statute requires that, of the 21 members, the President appoint at least 8 who are representative of labor, management, manpower programs, State vocational agencies, the handicapped, the disadvantaged other than handicapped, post-secondary vocational education programs, and the general public, including parents and students.

The original Council met all of these tests, although the Council in the beginning and today remains heavily dominated by educators, especially vocational educators. If you include the representatives of the American Vocational Association and the Future Farmers of America, 14 of the 21 members are professionals in education.

While the statute is less specific than some regarding representation, (i.e., a case can be made that a single member may represent two categories of membership) some definite changes in the Council's composition have already taken place. The terms of seven of the original members expired in January. These included the representatives of the disadvantaged (National Urban Coalition), organized labor, and the handicapped. The new appointees represent industry, the disadvantaged, the educational community, and post-secondary programs. Although a student was appointed for the first time, the new appointees do not include a representative of organized labor or the handicapped. As of January 1971, the Council includes one woman and one black to represent minority groups; there is no Mexican American member.

In January, the Council will undergo another change in its membership. The American Vocational Association representative will most likely be reappointed, but six vacancies crucial to the vitality of the Council will be created. In the view of the executive director, five of those expected to be retired are among the most active and effective members of the Council. In particular, the Council is concerned about the possible retirement of its chairman, Hugh Calkins, an attorney who was appointed for only a 2-year term.

The Council has established active committees concerned with the following subjects:

- Improving the image of vocational education and public attitudes toward it. Some public relations efforts are underway.
- Making curricula more relevant to the needs of students and the world of work. This is regarded now as a high priority item on the Bureau's agenda.
- Impacting on the manpower legislation now before Congress. The chairman's testimony is said to have been persuasive.
- Improving coordination with manpower programs.
- Developing more effective community-level planning to assist youth and adults who are out of work. This will necessarily be concerned with vocational education's role in CAMPS.
- Raising the position of vocational education in the Federal bureaucracy.

In general, the Council has served as far more than a protection association for the interests concerned. It has taken a fair and balanced view with regard to CAMPS and U.S. Department of Labor cooperation, has urged intelligent policies with regard to the disadvantaged ("don't make vocational education the system for whites and MDTA the system for blacks"), and has suggested experimentation with residential vocational schools.

The Council deserves HEW's support in securing appointees comparable in caliber to the present group. The Department should also take steps to assure that appointments are made promptly (9 months passed before this year's (1970) vacancies were filled).

State Councils

The State councils have the power to review the State plans for vocational education. This has the advantage of keeping the plans relevant to State processes, and probably in some cases will improve the quality of planning. In addition, it gives the Federal Government some control (already exercised) over the memberships of the councils, for unless the membership is consistent with the intent of the statute, the State plan may not be certified. Apparently BAVTE withstood some Congressional pressure on this issue earlier.

There was apparently an effort in the beginning by many State administrators to attempt to preempt the newly required State advisory councils by loading them with members who would not adversely criticize the status quo in the course of their evaluation work. This was pointed out in the National Association of Manufacturers vocational education report[1/] and is acknowledged in

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1/ National Association of Manufacturers, Editorial Department, "Vocational Education Study-Group Discussion Paper," unpublished report prepared for HEW, Office of Evaluation and Monitoring, New York, 1970.

Washington. Some competition was doubtless also felt by the State boards of vocational education. Training conferences for the councils, plus the threat to hold up State plan approvals has begun to turn this "loading" around somewhat, although time did not permit a detailed examination of the current situation.

The intended virtue of the State advisory councils is partial autonomy—their freedom to criticize and to raise issues that the established vocational administrators and/or State boards do not raise. That autonomy, while limited by the relationship of the boards to the governors, is extremely valuable and in the longer run bodes well for the State programs. An irritant of somewhat more than symbolic interest, therefore, was the position taken by HEW to channel the funds for the councils through State boards. It is hard to make a case for this extrastatutory requirement, which hardly seems in keeping with the philosophy of the act, and the suspicion of lobbying is raised. A better system would be to make the council allocations directly to the governors (in a single payment, to avoid the protracted delay presently plaguing at least one council).

There is evidence in one or two States that councils can function independently and effectively. The Tennessee body, for example, reviewed programs throughout the State and reported that State criteria and standards were not being applied. Asked why the State vocational education agency could not perform this evaluation task, the executive secretary of the National Council said that the State directors "have to keep the professionals happy." This is another example of how pressures, principally for the status quo, build up from the lowest levels, with each succeeding layer of the Federal system at least in part representing the professional positions of those whom they are assumed to lead.

In general, the role of the State councils could become important to the direction of the entire program. Periodic assessments should be made of their membership, their relative degree of activity, the kinds of priorities they have set, and the directions in which their activities are leading them. Joint studies should be undertaken by the National Council and one or more State councils to bring the national and State elements of the advisory system closer together.

Meetings of all the State advisory bodies together are now held semi-annually under the aegis of the national group, a step that has reduced the amount of "floundering" (i.e., searching for a role and a modus vivendi). This step has also stimulated the development of "a national constituency" among the State advisory councils. Whether for good or ill, these councils, as they begin to act together, will become a factor in the institutional matrix.

Council Leadership. In Massachusetts, the Governor has combined the State CAMPS chairmanship with the council chairmanship, appointing a single official who is now part of the statewide planning apparatus. Such combination appointments should be encouraged by both the Department of Labor and HEW.

Membership. The State boards should be required by legislation to include the following additional special categories of membership:

- Principal officer—responsible for statewide planning
- Student of vocational education—a person who is currently enrolled or was enrolled within the past 3 years.

The Public Hearings and Meetings. In describing the functions of the State board and the State advisory council, the Vocational Education Act includes provision for meetings and hearings in which the views, complaints, and special needs of the general public can be voiced. The State plan must be presented at such a public meeting.

These innovative processes are obviously intended to counterbalance what some see as deeply entrenched and in some cases obsolete attitudes and practices within some State systems. They deserve monitoring by the National Council, either because of the unique information which good hearings may produce or because bad hearings may require corrective intervention in some States. Of particular concern is the manner in which invitations to hearings are extended and to whom. The impact of public testimony on policy decisions is also worth examining.

U.S. Department of Labor and CAMPS

The 1968 amendments make it clear that a more constructive partnership is expected to exist between vocational education and manpower development agencies at all levels. Prior to the advent of the Area Redevelopment Act of 1961 there was, with few local and State exceptions, no organized relationship between these two systems. The different points of view between the two systems (and within at least the manpower system) produced conflict very early. While the mutual exposure was and continues to be advantageous, the cost in aggravation, and occasionally in adverse publicity, has been considerable. Congress and the White House from time to time have called upon the parties to "play nicely," but little was done with any permanent effect until the "Cooperative Area Management Planning System" was instituted.

The degree of tension appears less today than at any time in the past decade, although the reasons for this may turn out to be less encouraging than the outward signs. CAMPS does function as a kind of United Nations setting for airing problems, but it is hard to say whether, on the whole, this raises or settles more questions. The U.S. Labor Department's Manpower Administration assumed a strong State leadership role under the last Administration, but some feel that this causes State vocational education and the State employment service to join forces to combat the common (Federal) enemy. Others see Labor's difficulties with OEO for several years as distracting that Department from long-standing differences with HEW. One should not discount personal relationships and changes in the key actors as having some effect as well.

In general, the National Advisory Council's position seems to be reasonable—the problems are still there and need to be dealt with. These include differences regarding occupational selection, student placement, the amount of MDTA funds devoted to classroom versus on-the-job training, the degree of influence others should have over non-MDTA vocational training, the degree of assistance provided the disadvantaged, etc. In all probability, local solutions will vary and therefore many look forward to local government becoming a third party arbiter.

CAMPS is potentially of such consequence as to require detailed consideration now, and, particularly because of the pending changes, some follow-up to see how it is actually functioning in communities.

Vocational education has from the beginning been intended to serve in CAMPS as an equal partner with vocational rehabilitation, OEO, etc. Ideally, all of the manpower-related programs utilizing Federal funds are brought together at the local, State, regional, and national levels to consider how best to meet the manpower needs of each area and jurisdiction.

There is evidence of a great deal of log-rolling among the officials who sit at the CAMPS planning tables.[2/] Vocational education officials are also quick to admit that their local and State counterparts do not participate with great enthusiasm, in part because of a feeling that the Department of Labor and the State employment services dominate the system. Almost everyone complains that CAMPS, now more than 3 years old, is largely unworkable because of the impossibility of compelling any of the partners to live by the plans. On the other hand, it is difficult to think of an arrangement in which each of the interests would participate at all if compulsion were part of the process.

Despite the frustrations of the CAMPS process, everyone seems to agree that it has had a valuable effect on vocational education. It has brought the vocational educators together with others who have used different mechanisms and have worked with different client groups. At the national level, the vocational education staffers who have worked with the Labor Department, some of them since 1961, see themselves as having a somewhat broader and more independent perspective than their colleagues in the system, and this is probably also true among the vocational education staff in the States and localities.

MDTA itself has had beneficial effects aside from CAMPS, in producing new staff and equipment, in pushing schools into training in more occupational areas, and generally "in getting the educators out of their cocoons."

2/ CAMPS is seen by some as an extension of the U.S. Department of Labor clientele, and the minimal participation of HEW agencies lends credence to this assumption.

The National Advisory Council has devoted a great deal of attention to the question of coordinated, comprehensive local planning. While avoiding the term CAMPS, the Council resolved that the Government should "require that communities develop coordinated plans for reducing both the flow of untrained youth and the pool of unemployed adults." These plans, obviously, would require widespread participation by all of the health, education, welfare, and manpower agencies and organizations in communities and would be specifically directed at the skill needs of the areas' youth and adults. The Council acknowledges the pending legislation, which would make the mayors or city managers of large cities the prime sponsors of manpower programs and thereby would provide a greater degree of coordinative pressure than is presently available in most communities.

The Council qualified its recommendation for coordinated planning only by urging that existing institutions be utilized, that school officials be fully involved, that nonprofessionals as well as professionals be included in the planning effort, and that vocational education as well as manpower funds be "subject to the (local) plan". The Council did urge strongly, however, that "Education" (not specifically "Vocational Education") be given an equal voice with the Department of Labor at the State and Federal levels in supervising the formation and administration of the plan.

As viewed by vocational education officials, the Labor Department's contribution to the question of how to select those occupations for training which will afford graduates reasonable prospects for employment over a period of years has not been especially successful. They attribute this to the fact that Congress failed to appropriate special funds for these purposes; to failures of cooperation at the State level; and to the difficulties of making such projections, having educators believe them, and making it possible for educators to act on them even if they are accurate. As discussed elsewhere, vocational education curricula are not changed readily or easily. Vocational education is, for example, a much longer process than training in programs under MDTA and therefore requires projections of much longer range. As a general matter, however, the major problems of occupational imbalance within the vocational education systems are not those for which detailed occupational information will be of much help.

Labor Standards Legislation

Within the vocational education bureaucracy there is a considerable difference of opinion as to the significance of the constraints imposed by the Federal and State statutes, principally those describing "hazardous" occupations in which youths of specified ages may not work or may work only under restricted conditions. A reliable answer to the question of how serious those constraints are obviously requires study, but it may be useful simply to illustrate the degree of difference in the points of view of experienced men.

The joint National Association of Manufacturers-HEW reports[3] frequently mentioned labor laws as inhibitors, although no evidence was provided to illustrate the case. BAVTE official Howard Matthews believes that such legislation ties the hands of vocational education administrators, especially with regard to the so-called "co-op" programs in which youth work in private employment while they study.[4] Matthews says the statutes were intended to limit the labor force more than to protect children and that the laws have lagged behind the realities of what is appropriate for youth (more work opportunities) and what is actually hazardous on the job.

BAVTE's Edward Rumpf, on the other hand, finds the constraints of little real significance for several reasons. The laws and their interpretation have been liberalized somewhat in recent years. Many who complain are not really familiar with the applicable laws and assume coverage when that is not actually the case. There are, he insists, a wide number of occupations not proscribed because of their hazard.[5]

Rumpf recalled a meeting with automotive manufacturers in which they complained that they could not hire young trainees for mechanical work because of the Federal statute. Rumpf pointed out that this was not legally a hazardous occupation. He indicated that he felt that many school authorities and employers use the supposed legal problem as "an excuse for not doing something." He said that in Pennsylvania he managed to place students in technically covered occupations with complete legality by assuring that there was "school supervision."

Several things are clear. State labor standards legislation and enforcement practices vary considerably. Unions are concerned about the depressing effect on wage rates which conceivably could accompany a flood of youth entrants into skilled occupations. Right or wrong, the unions represent a considerable institutional resistance to major changes in these statutes. An inventory of possible studies on this subject is needed. In the absence of such a study, the issue appears to loom large enough at least as a psychological barrier that it deserves an independent examination.

Intergovernmental Relations—The State Agencies

It is certainly not unique to say of the Federal-State vocational education system that it is difficult to make generalizations regarding the quality and direction of the programs at and below the State level. Variations are, if not an intention of federalism, at least a necessary result, and all conclusions should be viewed with this limitation in mind. Some States, for example, are

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3/ A series of two unpublished reports on the "HEW-NAM Vocational Education Fact-Finding Program," Washington, D.C., 1970.

4/ Interview, Washington, D.C., September 1970.

5/ Interview, Washington, D.C., September 1970.

still enmeshed in farm or farm-related training. For some, it is a matter of pride that they turn away vast numbers of "less qualified" students each year, keeping the system selective to the point of exclusiveness. Other programs are "dumping grounds" for the poor. Some are virtually all white; some are virtually all black.

In view of these differences, it is hard to trace a pattern of relationships between State agencies and the Federal bureaucracy except to make four generalizations:

- "State" by and large means not the elected Governor, but the State board (rarely elected) and the appointed State director of vocational education. There is a tendency for the board and the director to try to operate independently of State education departments, the remainder of State government, the Federal offices, etc. It is not unusual to find a State official defending an action to a State complainant as federally inspired and to a Federal complainant as State inspired. He has two bosses and as the Bible makes clear, such a set-up rarely works.

- All intergovernmental bureaucracies—education not the least among them—have a tendency to respect the power flowing up from the "grass roots" and to give it greater weight than power which is directed downward. This often reflects a status quo versus change struggle with the States in the middle.

- Differences generally come to light in the State plans. A brief word about these plans. Vocational education traditionally reinforced its interpretation of the Federal statute by applying the pressure of delay of approval of State plans. Decentralization of approval leaves the Bureau of Adult, Vocational, and Technical Education without this weapon at a time when the Administration may wish to assure that there is greater compliance with the new statute.

- Even the most centrally-inclined administrator is at a disadvantage in enforcing Federal statutory intent under a situation in which administration is delegated to State agencies, largely operating under quasi-autonomous State boards, and in which costs are shared to a considerable degree by States and localities. All of these factors are present in the vocational education program. As a trade-off for intergovernmental support, we have come to expect a degree of flexibility in the

application of national policies. The State plan represents a kind of contract around the details of which a certain amount of bargaining proceeds not unlike some labor-management negotiations. At times, certain administrative or policy failings are simply ignored in some jurisdictions on the grounds that the prospects for change are hopeless. Which policies are pressed, by what means and in which jurisdictions, are the difficult questions faced by Federal administrators in grant-in-aid programs of this sort. All of which is to say that the bravest reforms conceived in Washington must be expected to suffer a certain degree of erosion beyond that ordinarily associated with administrative implementation on the grounds that this is the price of federalism. Vocational education is a highly "Federal" program in this sense.

The Students

One of the factors—if not an institution—that impacts on vocational education is the student. Perhaps more today than in years past, student likes and dislikes affect enrollments generally and occupational emphasis specifically. They, more directly than their parents, the unions, labor market analysts, and management, impact on the image, direction, and success or failure of the whole system and its component parts. They are, the NAM's expression to the contrary, the primary consumers; their views will be disregarded at considerable peril. This of course is implicit in the suggestion (not quite a requirement) that a student be represented on the National (not the State) Advisory Council. This representation, however, must necessarily be largely symbolic. No single student can pretend to do more than raise questions about student participation.

Of greater significance is the opportunity to survey enrollees, dropouts, graduates, and those who might be considered primary candidates for full participation in a vocational education program, asking them such questions as:

- What appears to have brought some students into the program? Are they seeking something here or avoiding something outside vocational education? Within classifications of students, what are the appeals?
- Along the same lines, what led others not to pursue vocational education or still others to drop out? Are these factors that are correctable within the system?
- What techniques or other inputs appear to result in high motivation or particularly high skill levels?

- What appeared to the graduates placed in related work and other graduates to be the most and the least useful parts of the program?

In short, planning vocational education requires market research into the student as a consumer. These kinds of studies should be initiated by BAVTE and the National Advisory Council and conducted to the degree possible with the active cooperation of State agencies. This partnership assures that the states appreciate firsthand the answers received and that the Federal office will have available comparable data from selected regions and States around the country.

The Community

At present, communities—counties as well as municipalities—share in the cost of vocational education and thereby can be expected to play an important role in shaping the program. Moreover, even with Federal funding, bond issues are often required before construction is permitted. In more or less formal ways, local lay leadership impacts on curricula, the relative degree of emphasis given to vocational versus general education, and the degree of attention given to various groups within the community.

The division of responsibility for funding, while desirable from a cost sharing point of view, has the disadvantage of dividing responsibility and concern over three levels of government. While there is some reported concern in some communities regarding the relatively high per-pupil cost of vocational education, the prospect of investing a relatively small amount of local funds to receive "free" money from the State and Federal capitols has the tendency to relax criticism to some degree. This is not to say that hard questions are never raised at the local level, simply that they are more easily passed over in a cost-share situation.

The introduction of the Cooperative Area Manpower Planning System has begun to change the position of the vocational education system in the sense that it is now required, to the degree that it participates in CAMPS, to deal with many new local entities whose objectives are closely related to its own. While CAMPS has reportedly influenced few major decisions within the vocational education system, the simple requirement that officials from a variety of sometimes competing organizations display their intentions to their peers has at the minimum provided better information for planning. On the other hand, no one has expressed a belief so far that vocational education programs have benefited by the addition of new resources (e.g., health, education, etc.) through CAMPS.

Beginning this year in the major cities, CAMPS will become a more organized process and the leadership will be removed from any of the competitive parties by placing responsibility in the office of the mayor or manager. Both vocational education and manpower officials appear to regard this now as a desirable development. It would appear useful at this point to experiment with various

degrees and kinds of vocational education participation in local CAMPS mechanisms. Some BAVTE officials, for example, would place real authority in local interagency planning bodies. This should be attempted even, as acknowledged, at the risk of seeing some decisions run counter to the traditional interests of vocational educators. There is a widespread recognition that real duplication of programs and competition for trainees and students will not be long tolerated by an impatient electorate. A great many alternative formulae for local decision-making can be developed which should be tested, and these need not be anything but helpful to the vocational education system as well as to manpower programs generally.

Employers

The employers' impact on vocational education is appropriately respected throughout the system; if students are not hired, the program is a failure. It may be useful, however, for the States and the Federal Government to look more closely at the placement statistics in terms of their relevance to the investment in specified occupations and the actual courses provided. If this is done, it should be within the context of a careful examination of what various classifications of employers <u>really</u> want (that is, what are their practices as distinguished from their public expressions). It is conceivable, of course, that some employers would be perfectly satisfied with graduates who are better grounded in the "three R's" and less familiar with the use of equipment, which some feel they can teach better and faster themselves. Many employers ask only that job-related social skills be offered, i.e., ability to take supervision, meet schedules, work cooperatively, etc. These kinds of questions are probably the more useful, as they are the more painful, and they should not be answered by hearsay or "scatter-shot" interviews.

Because of the National Association of Manufacturers-HEW survey (see footnote 3), a number of businessmen and their representatives now have a much better appreciation of the difficulties and complexities of the system than would otherwise be the case. This should be exploited on a continuing basis; that is, future surveys, more scientifically constructed and executed, should to the degree possible involve leaders (not just any businessmen) of the chambers of commerce and manufacturers associations, State and Federal.

If is of some value that the manufacturers consider themselves to be "the consumers" of vocational education, as stated in the NAM study. The more stake they feel in the system, the more relevant the instruction and the greater the support the system can expect. That support, considering the objectives of vocational education, does not appear to be especially strong now. Perhaps, in view of the overwhelming Congressional support, business help is not important now. It may, however, turn out to be important if hard questions are raised after Federal and State funding becomes more limited.

While there are businessmen on the National Advisory Council, none of them appears to be "representative" of the business community in the sense

of representing the NAM or the national chambers of commerce. If this is true, consideration should be given to including those who can communicate with a wide constituency within the business world as distinguished from those who can merely provide one businessman's view.

In general, one is inclined to agree with the NAM study that employers are only "passively involved" in the program. Vocational education is not, as in some European countries, a direct cost to employers. Moreover, unemployment is high and employers have more workers to choose from. Large- and medium-sized industry has largely developed its own training capacity (not all of it or even much of it as trainee-oriented as vocational education, to be sure) and this has permitted employers a considerable detachment of view. It is of some interest that the NAM study did not raise fundamental questions regarding the existence or major directions of the program, but merely concerned itself with how a few employers (manufacturers) viewed the existing system. Without considerable change in the relationship of employers to vocational education (e.g., cash investments, greater dependency on vocational education as a labor source, more involvement in planning and evaluating), it is hard to see employers and their organizations as serving as an important force for institutional change in the system.

The American Vocational Association

Time did not permit more than a cursory look at this traditionally important private institution whose role in shaping legislation and administration has been especially significant during the past decade when many old practices were under attack and some in the process of change. The effort to shake free from the traditional major categories of training—e.g., agriculture, home economics—has to some degree been impeded by AVA, whose leadership is composed to a considerable degree of senior teachers who have considerable stake in the perpetuation of these categories. AVA maintains suborganizational structures representing these old categories. One BAVTE official said simply, "the AVA can't get too far ahead of its membership."

Similarly, time did not permit an examination of the influence of the U.S. Department of Agriculture and the Future Farmers of America. Vocational education has been under attack at least since 1962 for what many consider to be an investment in farm-related training that is inconsistent with labor market assessments of job opportunities. We may assume that these two institutions have some influence on the continuation of this form of training, but the degree and kind is presently undetermined.

Civil Rights Organizations

Only a cursory look at the position of these groups was possible. As a general matter, NAACP, CORE and the Urban League have been critical of the rural, small town, white student emphasis they see and of what they regard as underinvestment in big cities where black enrollment runs high. The one civil

rights organization representative (Carnoria Johnson of the Urban League) was dropped from the National Advisory Council on Vocational Education in January 1970 and no replacement from that sector has been made. There are not and have have not been any Spanish-speaking representatives on the Council. No effort appears to have been made by BAVTE or the Council to secure minority group representation on the State councils or State boards. BAVTE and the Labor Department have, however, awarded contracts to civil rights organizations for special efforts to bring black students into the program and for similar purposes. It is not clear whether these are ad hoc decisions or whether they are intended to contribute toward policy changes throughout the country.

It is of some interest that the NAM survey reported complaints by Mexican-American leaders (vocational education is being used as a "dumping ground for Chicanos") and noted that "there is a notable lack of either Afro or Spanish-speaking Americans in the ranks of vocational educators." White counselors, the study reported, steer black students into "traditional occupations."

As an institution, the civil rights organizations can be viewed as being somewhat concerned about vocational education but not, especially at this time, influential in changing it.

Trade Union Participation

The trade unions of the United States are important to the vocational education system, although their impact varies considerably by union, region, occupation, and industry. Unions have no impact on agricultural or home economics training, marginal impact on office skills training, and considerable impact on the apprentice trades. The impact of organized labor on manufacturing occupations is susceptible to all of the influencing factors above plus size of the employing unit.

"Impact" may mean that an individual local union, a local or State council or an international union provides some form of assistance—e.g., cooperates in joint training ventures or provides advice in curriculum preparation—or it may mean that a union action limits the discretion of vocational educators and/or students in some fashion, possibly through the provisions of labor-management contracts or the support of legislation affecting jobs and training for youth.

The study conducted by HEW together with the National Association of Manufacturers indicated that as a general rule, unions, like employers, were in the main passively supportive of vocational education. While some unions in some cities use vocational education programs as the source of many of their new members, others with greater problems of job security treat secondary vocational education students as economic threats in the labor market. Nepotism has long characterized many of the craft unions, a pattern that is scarcely distinguishable from ethnic discrimination in many instances. Strongly held views regarding job security, the "inheritance" of a trade (and therefore a union card), and social distinctions among workers have not been lightly put

aside under challenges from minority group organizations, government agencies, and others. They are certainly stronger motivating factors than the minor feeling of civic virtue that attends cooperation with the vocational schools.

Union resistance in some communities has been reduced by hiring instructors from among the leadership in the unions, thus providing a measure of assurance that training practices will not violate traditional methods of specific craft unions.

Many unions are suspicious of government programs and actions which they see as providing a cheaper source of labor for employers. An abundance of cheap labor obviously would undercut prevailing wage levels which were often won at considerable cost in union effort.

Other union leaders are distrustful of efforts to lower restrictions on child labor, either in terms of occupations covered by State and Federal statute or of age levels at which youth can begin various jobs. While recognizing that some changes may be necessary, the focus of union concern continues to be the problem of flooding a sometimes already saturated labor market with young people who could drive down established wage patterns.

Many industrial jobs have become so routinized that no special skills are required, none, at least, that cannot be provided after a worker is hired. Many union contracts specify this kind of skill development as a means of equalizing opportunities among jobseekers. This in turn tends to put the vocational school graduate on an equal footing with others who are without skill training, to the distress of some vocational educators.

Many union practices are injurious to equal opportunity, to rational use of the labor force, to profits, and to the vocational education system. At the same time, many union practices are grounded on deeply held beliefs that relate to the life and death of the trade union system itself or to the social status of the workers concerned. Regardless of the merits of their position, accomodation will require a good deal more dispassionate understanding on the part of vocational educators than is sometimes the case. Some union practices that are truly detrimental can and have been modified by active negotiation. One does not feel that the U.S. Office of Education has taken steps to foster such action at the Federal, State, or local level. No union representative now sits on the National Advisory Council. HEW's examination of trade union attitudes and actions regarding vocational education was made through the medium of the National Association of Manufacturers study. Involving national trade union leaders in the Council and in an examination of the system could be anticipated to produce benefits analogous to those anticipated for employer groups. Certainly, these two steps are not all that is required; a good deal more needs to be done in order to reach a better accommodation than presently exists. Additional steps should be planned with representatives of organized labor. Hopefully, this will offer an opportunity to vocational educators to understand better the assumptions and motivations of organized labor and vice versa.

INSTITUTIONAL CHANGE

The intention of the 1963 and 1968 amendments was clearly to change the direction of vocational education. By establishing the councils, and through special provisions, the Congress gave evidence that it expected vocational education under the 1968 amendments to become a more contemporary system. Toward that end it authorized specific expenditures of funds to alter existing institutions and conceivably to create new ones outside the traditional channels of Federal and State agencies, State boards, and local school systems. Moreover, there is a clear mandate to strengthen working relationships with vocational rehabilitation, the Labor- and OEO-sponsored manpower units, higher education, etc. Special reference is made here to the parts of the vocational education statute dealing with "exemplary" programs, research, and experimental, demonstration, developmental, evaluation, and other forms of innovation in behalf of the disadvantaged.

Part C of the statute is a conscious replication of the experimental and demonstration projects initiated in 1962 by the Department of Labor under MDTA, which resulted in bringing the disadvantaged into manpower training as well as bringing new institutions and instruments into the traditional State employment security-vocational education patterns of operation. While there was some resistance to the introduction both of new clients and new service agencies among the established organizations, many of the concepts pioneered in 1962-64 have since become permanent elements of the philosophy and practice of the manpower development system.

It will be important, therefore, in the evaluation system to determine the degree to which the Federal and State agencies do indeed use these special funds to make substantial changes needed in existing systems and to help bring into the new vocational education system organizations and talents essential to the new, broader mission.

It may be useful to recall the experience of two somewhat similar opportunities for change and improvement in recent years. Title I of the Higher Education Act was intended to lend the resources of the universities to the resolution of most critical problems facing American urbanization. Many critics from the cities feel that this opportunity to forge a working partnership between the social scientists and the local officials was frittered away in projects whose relationship to the needs of the universities was far greater than their relevance to the needs of the cities. On the other hand, the vocational rehabilitation amendments of 1954 offered the State and Federal Governments an opportunity to foster the development of brand new institutions (e.g., workshops for the most severely impaired) which in turn had an important effect on changing the practices of the public agencies themselves. Artful leadership by the Federal administrator doubtless contributed to a better record of investment in this regard by the State agencies than would otherwise have been the case.

In sum, it is important that the State and Federal agencies employ their most creative, least tradition-bound staff members in the task of building and modifying existing institutions through the statute and that the councils undertake as a continuing responsibility the evaluation of the degree to which the agencies are attempting to bring new talents and systems into vocational education.

This last point deserves emphasis. The councils are, by their membership structure (the appointment of a student, for example), clearly mandated to serve as catalyst for change. They need to recognize that the law provides essential tools in effecting change and therefore are of special concern to them. Without intruding on management, the councils should include among their recommendations ideas for the effective utilization of the authorized funds.

The councils should also be careful to reassure State and Federal administrators that they understand that often these funds will need to be invested in ventures that are somewhat speculative—successful change is never guaranteed. While it is a serious mistake to be so cautious as to prevent new developments, it is not a serious error if some experimental activities turn out poorly.

The councils should also bear in mind that a large portion of the proposals put forward independently for public agency funding spring initially from the needs and interests of the proposing organizations and do not always serve the most important needs of the funding agency. In the regrettable rush to close the books at the end of the fiscal year, public officials are sometimes less scrupulous than one would hope about weighing these differences. The development of a general set of objectives early in the year affords time to solicit responses from potential outside sponsors in time to permit a higher quality funding than simple reliance on the market.

Institutional Change Through Training

The vocational education system is in the process of the most complicated kind of change. It cannot simply expand old systems; it must bring (if not create) new ones into the system and work more effectively with partners not actually within the system. This kind of institutional change characteristically brings friction and inefficiencies. Few public programs are far-sighted enough under similar circumstances to invest sufficiently in one of the most effective lubricants for change, systematic training of the participants to assure full understanding of their own and others' role changes.

The development of a systematic and extensive training program during the next 18 months should include State administrators and representative State council and board members, in part to assure their effective working together, but also to assure an understanding of their place and their responsibilities in a changing overall program system. Special consideration should be given not only to the increased participation of vocational education people in changing the CAMPS system, but also to training the new, local government based CAMPS planning and evaluation staffs (generally assigned to the mayor or city manager) in the responsibilities and potentialities of vocational education. This could be

accomplished in connection with the training recently funded by the Department of Labor to be conducted by the U.S. Conference of Mayors. HEW's participation in the new planning system is too important to permit the Labor Department to take most if not all of the responsibility for leadership with the cities.

Some orientation also should be afforded the institutions being brought into the program unders Parts C and D and to the manpower organizations, cooperation with which is stressed so heavily in the statute.

In short, something other than the usual annual or semiannual conference is required to make prompt and effective improvements in functioning throughout a rather complex system. Administrators should investigate some of the successful case study training provided by public agencies to their staffs, including some in HEW.

Interdepartmental Cooperation—Proposal for a Joint Center

With the manpower development system divided as it is by professional, legislative, organizational, and historic differences, effective partnership remains on everyone's agenda—in fact, it rarely seems to get off those agendas and into action. The search continues for meaningful institutional arrangements in which the dependence of the potential partners as well as their resources can be brought together into a joint function that is viable because it meets needs virtually everyone can appreciate.

One possible step in this direction relates to the common interests that HEW and Labor have in innovation and evaluation and the respectable if not wholly adequate resources which they are now applying largely independently of one another. The suggestion concerns the prospect of creating a research and demonstration consortium mutually staffed and financed by the two departments and tied in some appropriate manner to the needs of the Domestic Affairs Council and the Office of Management and Budget. This last is significant because of the importance of building into the R&D priorities long-term needs that transcend the departments concerned.

There are, of course, a great many pitfalls in such a concept, some of which have already been painfully discovered through such noble failures as the late "President's Committee on Manpower." The pitfalls seem, however, to be mostly operational and are not inherent to a joint R&D venture.

Among the issues requiring joint attack are the following:

- The provision of useful occupational information needed to plan curricula and direct placements
- Development of improved, common information systems for all major manpower programs
- The development and testing of comprehensive planning and evaluation systems applicable to local, regional, and State decision-making (see separate discussion re inadequacies of CAMPS)

- The development and testing of in-service training systems for teachers and counselors who are unfamiliar with special problems of the disadvantaged
- An examination into the hiring practices of employers with respect to graduates of MDTA and vocational education programs
- Examination of the impact of child labor legislation on occupational training in various jurisdictions
- A study of the attitudes toward occupational training of various groups of trainees and potential trainees, including graduates, dropouts and non-applicants; the study should stress their expectations, and actual benefits, major weaknesses, etc., as seen through their eyes
- Evaluation in general.

It is unlikely that the Manpower Administration or the vocational education system will be moved to another Department.[6/] A more plausible course of action is to require the disparate units to work together at the point (yet to be specifically defined) at which innovation, research, and evaluation should impact upon most if not all elements of the system and thus begin to direct the advanced thinking on vocational education and manpower toward cooperative solutions.

6/ A move of this kind may be less unlikely in view of the President's recent statement on Federal reorganization.

VI. VOCATIONAL EDUCATION OBJECTIVES

INTRODUCTION

The purpose of this section is to provide a framework in which the information presented in this report can be utilized to assist policy decisions. The most probable objectives of any vocational education program are defined, as well as those implementation strategies or funding mechanisms which can or do link specific programs to the generalized objectives. It should be emphasized that we are not advocating any of these objectives, strategies, or programs but rather are attempting to show how the existing data are related to them. It is the responsibility of policy-makers, using the defined relationships as a touchstone, to extrapolate the information contained in the report to their specific circumstances and objectives. Our goal is simply to provide the decision makers with the information in the most usable format. An additional benefit of this approach is that it highlights the patterns of missing data so that future evaluation programs can be designed to fill the gaps.

EVALUATION AND OBJECTIVES

When analyzing the effectiveness of any vocational education program, the first task—an essential one, and usually the most difficult—is to define the objective of that program, i.e., the standard against which effectiveness is to be measured. A number of legitimate objectives for vocational education programs can and have been stated, but in the formulation, legislation, and execution of most current vocational education programs the objective is often implied rather than explicitly set forth. In the few instances in which an objective is made explicit, it is either vague or difficult, if not impossible, to measure.

The existing vocational education analyses, therefore, have assumed some particular objective and then measured a program or portion of a program against that criterion of effectiveness. As a result, the limited analytical information available is not easily generalizable; nor are comparisons among the programs possible. First, to permit comparison of the analysis of one vocational education program with the analysis of another, both must have used the same measure of effectiveness, i.e., must have been premised on the same objective. And even those evaluations which utilized the same criterion or similar criteria of effectiveness cannot be readily compared because of differences in the populations studied, methodology, timing, etc., which could not be completely controlled for or corrected in the analysis.

Another problem is that alternative objectives are sometimes mutually exclusive, in part or in toto. Thus, a high effectiveness rating in terms of one objective may necessarily mean low effectiveness in terms of a second objective. In other cases, the alternative objectives are positively related to some degree—that is, doing well in terms of one objective will probably mean doing well in terms of another objective. This positive relationship is, however, usually not linear and frequently not continuous over the whole range of effectiveness.

ALTERNATIVE OBJECTIVES

In every analysis of vocational education the objective[1] selected as the criterion for success is determined by (a) the purpose of the analysis[2], and (b) the institutional affiliation and theoretical background of the analyst. For the purpose of the analysis, a set of objectives was developed through discussions between HEW officials, outside "experts," review of legislation. These seven objectives are listed and then discussed individually. The discussion includes an elaboration of the objective, its strengths and weaknesses, the ideal data necessary for analysis of the degree to which the objective is achieved, actual data reflecting upon objective attainment, and a net appraisal of how well vocational education has accomplished the prescribed goal.

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[1] "Objectives" and "goals" will be used interchangeably here. Some analysts hold that one term is more specific than the other, but there is no consensus of opinion on which is the more precise, and usage varies.

[2] For examples of the various objectives toward which vocational education may be addressed, directly and indirectly, see Arnold Kotz (ed.), Occupational Education: Planning and Programming, Vol. 1, Stanford Research Institute, Menlo Park, California 1967, pp. 39-40 and 183-193; Grant Venn, "Objectives and Goals of Occupational Education," in Kotz, op. cit., especially pp. 52-53; Harold Starr, and others, A System for State Evaluation of Vocational Education, Ohio State University, Center for Vocational and Technical Education, 1970. Appendix B.

The seven alternative objectives are:

- Facilitate the student's probable labor market success in terms of vertical occupational mobility.
- Provide training that will facilitate horizontal geographic and occupational mobility to secure optimal utilization of aptitudes.
- Enhance the quality of American life through a more efficient allocation of resources and a net contribution to the gross national product and/or other indicators of social and cultural growth.
- Improve the net fiscal position of government by improving tax collections relative to disbursements.
- Improve the quality of the labor force and thereby enhance the supply of trained labor.
- "Keep the kids off the street" by occupying their time creatively until they are ready to participate as responsible members of the labor force.
- Provide education and training to students with low academic aptitude who may have nonacademic, e.g., mechanical, aptitudes.

Goal conflict among these objectives is possible. Maximizing vocational education's contribution to GNP, for example, may conflict with the objective of providing education and training to low academic aptitude students while being harmonious with the goal of optimizing the structure of the labor supply. On the other hand, it may well be that provision of skills to low academic but high mechanical aptitude students may result in utilization of formerly underemployed talents while simultaneously keeping young people out of trouble and providing a net positive contribution to GNP, trainees, and the states' fiscal resources.

None of these objectives should be construed as <u>the</u> objective by which vocational education should be appraised. Their relative worth will be determined (weighting) through the legislative-administrative

process, although means are available for making weights explicit to facilitate decision-making and its evaluation. 3/

IMPLEMENTATION STRATEGIES (OR FUNDING MECHANISMS) FOR ALTERNATIVE OBJECTIVES

Strategies are defined here as funding mechanisms whereby a particular program is carried out. A strategy implies neither a particular objective, nor a particular program; however, different strategies may well affect the degree of success in achieving some particular program objective. Although very little information is available on the relative effectiveness of different strategies, this material is included as a reminder that strategies are an integral part of vocational education policy formulation and also to underscore the need for analytical work in this area. The following implementation strategies or funding mechanisms have been identified as the most representative and inclusive.

- Block grants—two or more categorical programs are combined into one program with a common authorization/appropriation/distribution mechanism, administrative procedures, and expenditures and restrictions.
- Revenue sharing—the Federal government annually distributes a specified portion or percentage of base of the Federal income tax to the States.
- Tax credits—the taxpayer credits against his Federal income tax liability a percentage of his State income tax payment.
- Purchase of services—any procedure by which the Federal Government contracts directly with a supplier for a public service rather than transferring funds intergovernmentally for this purpose.
- Voucher/G.I. Bill system—any approach whereby the Federal Government provides a voucher for funds directly to an individual for the purchase of a specified public service.

3/ See, for example, A. Myrick Freeman, III, "Project Design and Evaluation With Multiple Objectives," in Analysis and Evaluation of Public Expenditures: the PPB System, Joint Economic Committee, Ninety-first Congress, First Session, U.S. Government Printing Office, Washington, D. C., 1969, pp. 565-578.

- Incentive payments—any form of intergovernmental transfer that financially rewards a governmental level for certain types or levels of expenditure. (Accomplishment [outcome] payments, are another alternative.)

- Matching funds—Federal funds are provided in some specified proportion to the non-Federal funds provided for a particular program. The matching ratio is a critical variable.

- Payroll/employer taxes for training purposes—tax credit is given to employers for the operation of employee training courses, usually vocational.

- Discretionary funds (project grants)—any appropriation over which a governmental agency retains broad authority in determining either the purpose for which the funds are expended or who the recipient of the funds will be, or both.

- State and/or local funding—expenditures by these units of government without any Federal participation.

- Nonreimbursed private expenditures—any expenditures made by a private citizen to obtain vocational education for himself without prior or subsequent reimbursement by government or industry.

Any vocational education policy decision will involve the determination of the objective, the type of program to be undertaken, and the implementation strategy or funding mechanism that will be utilized to carry out the specified program.

ANALYSIS OF OBJECTIVES

In the remainder of this section each of the objectives listed above will be discussed individually. Strengths and weaknesses are identified and the ideal data for analysis of the degree to which the objective is achieved are described. A summary is then provided of the actual data available to reflect objective attainment, followed by a net appraisal of how well vocational education has accomplished the prescribed goal. Data on alternative strategies are noted only when the strategy was an explicit dimension of effectiveness measurement.

OBJECTIVE 1: FACILITATE THE STUDENT'S PROBABLE LABOR MARKET SUCCESS

Elaboration of Objective

Objective 1 reflects the hope that vocational education can provide a means for students to improve their economic and noneconomic status. Enhanced satisfaction—in either relative or absolute terms—with job, income, and/or social position would reflect progress toward this goal. Intergenerational mobility, a part of Objective 1, refers to the improved status of sons relative to their fathers or grandfathers and is another measure of the efficacy of vocational training.

Summary of Findings

a. Vocational education graduates (see Section IV comments on post-secondary and junior college graduates) have higher earnings than control groups (secondary academic graduates).

b. Vocational education does not have a large percentage of disadvantaged students; only about 13 percent of fiscal 1970 enrollees were found to be disadvantaged.

c. The success of vocational education graduates may be due to their general academic achievement rather than to specific skill preparation. It may also be due to employers simply using the vocational education "credential" as a cheap screening device to eliminate disadvantaged applicants in loose labor markets.

d. The impact of vocational education on intergenerational mobility is uncertain.

e. Income of graduates appears not to be equal among curricula, between public/private institutions and in-State and out-of-State jobs, and among clientele served.

f. Vocational education graduates do not appear to be more satisfied with their jobs; academic and vocational graduates appear to have about the same degree of job satisfaction.

g. Student knowledge of the labor market is correlated with wages, so that on the basis of preliminary results, gross (uncontrolled) data fail to contradict the value of programs oriented to the world of work.

Ideal Data

The ideal data necessary for evaluation of programs to promote upward mobility and personal welfare should reflect the net increase in the students' social and economic welfare and status, on both an intragenerational and intergenerational basis, above the status and welfare they would have achieved without training. The students' self-perceptions of their socioeconomic gains should also be included.

As dependent variables then, and proxies for "socioeconomic welfare" one could use net job satisfaction, occupational earnings, and social status, the net aspect of these indices being determined through the use of control variables. Statistical studies ideally would be based on multivariate techniques that control for such variables as: training program, including general and academic students in relatively specific terms (e.g., training for "nurse aide," or "licensed practical nurse" rather than "health occupation"); socioeconomic background of clientele (e.g., low income whites on middle income blacks); academic aptitude; nonacademic talents (mechanical or musical, for example); sex; quality of vocational education received in terms of net skill improvement; attitudes toward material gain and willingness to work; quality and quantity of post-secondary education received; and the nature of the labor market into which the youth graduates (e.g., regionally depressed, apprenticeship opportunities restricted by unions); and age, because vocational education includes adult as well as youth programs.

Actual Data and Assessment of Achievement

Actual data fall far short of the ideal. A large number of analyses have been conducted, but because of limited resources and the complexity of the task all have been found wanting in some respect.[4/] J. Kenneth Little reports some

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4/ For bibliographies and reviews of this literature see, for example: J. Robert Warmbrod, Review and Synthesis of Research on the Economics of Vocational-Technical Education, Ohio State University, Center for Vocational and Technical Education, Columbus, 1968; California State Department of Education, Vocational Education Section, Research Coordinating Unit, Evaluation in Vocational Education, State Department of Education, Sacramento, 1967; J. Kenneth Little, Review and Synthesis of Research on the Placement and Follow-up of Vocational Education Students, Ohio State University, Center for Vocational and Technical Education, Columbus, 1970; Gerald G. Somers and Susan B. Fernbach, An Analysis of the Economic Benefits of Vocational Education at the Secondary, Post-Secondary, and Junior College Levels: A Preliminary Report on an Evaluation of the Effectiveness of Vocational and Technical Education in the U.S., University of Wisconsin, Center for Studies in Vocational and Technical Education, Madison, 1970, pp. 12-23.

of the problems in interpreting studies of the net increase in earnings through vocational education:

> Inconsistencies in reporting practice, absence of knowledge about labor markets, differences in wage levels between vocational programs, differences in education and training, differences in geographical location, changes in the value of the dollar, and scarcity of comparative information about occupational status of graduates of non-vocational programs make summaries of information expressed in dollars hazardous, if not useless.[5]

Because of the scarcity of other indices of vertical mobility, and in spite of the fact that there are the above and other data problems, the net monetary benefit accruing to the vocational education graduate will be the principal index of mobility examined here,[6] although two tangentially related occupational analyses will be discussed also.

In spite of the qualitative differences in data and methodology, Little reports that vocational education graduates do seem "to have an advantage in earnings," "like their jobs," and, if they are graduates of a post-secondary program, experience a "clear advantage" over those lacking post-secondary training. He does, however, have doubts concerning the interpretation of these findings, when he goes on to comment that "the very completion of a diploma, certificate, or degree program seems to be the key factor."[7]

Another survey of the value of vocational education to its graduates, by Warmbrod, reports that vocational education was not only of value to students, but it was a sound investment in terms of returns versus costs.[8] Like Little, however, Warmbrod reflects the analytical complexity and seems to undercut his own conclusions when he reports that "neither adequate benefit nor cost data are presently available for meaningful analyses of vocational-technical edu-education."[9]

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[5] J. Kenneth Little, op. cit., p. 23.

[6] As Gerald Gurin comments, "...the trainee's job earnings in the period following his program experience...ultimately, this has to be the major criterion by which they are judged." (Inner-City Negro Youth in a Job Training Project, University of Michigan, Institute for Social Research, Survey Research Center, Ann Arbor, 1968, p. 37).

[7] Little, op. cit., p. 36.

[8] Warmbrod, op. cit., p. 39.

[9] Ibid., p. 39.

The most recent survey results to come to light are from a nationwide survey of secondary, post-secondary, and junior college vocational graduates.[10] With other control variables held constant, all three of these forms of vocational education provided significantly higher monthly earnings than were received by the control group of secondary academic graduates, who have, according to Project TALENT, significantly higher socioeconomic status and verbal ability. The labor market success of junior college graduates was particularly pronounced. The post-secondary technical graduates were notably less successful, and the secondary vocational education graduates still less so, but all fared better in the market than the academic group with no training beyond high school.[11] Respective junior college, post-secondary, and technical and secondary vocational education net monthly earnings above the secondary academic group were $198, $83, and $56.[12] The actual value of the specific skill training appears somewhat doubtful; however, "graduates at all school levels who entered jobs <u>related</u> in some way to their vocational training started at 9¢ less per hour than graduates who took jobs in <u>completely unrelated fields</u>." The report concludes that "continued stress on specific vocational fields of training may not be appropriate," and that (here they quote Jacob Kaufman)

> ..."style" of vocational education as a curriculum should be incorporated in the regular education curriculum and that vocational education should not concern itself with skill training as an end in itself.[13]

These surveys of the literature and vocational education graduates eventually, then, lead to Eli Ginzberg's question:

> Do the knowledge and skills acquired...add a necessary increment to the young person's personal capital? Or is the present reliance of many employers on a high school diploma as a prerequisite for employment for

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10/ Somers and Fernbach, <u>op. cit</u>., especially pp. 69-107.

11/ These results are fully detailed in Section VIII.

12/ Somers and Fernbach, <u>op. cit</u>., p. 90. Considering the lower cost of academic programs at all levels, and the importance of controlling for capability and self-selection, it would have been preferable to compare the post-high-school technical earnings with post-high-school academic earnings.

13/ Jacob Kaufman, "The Role of Vocational Education in the Transition from School to Work," in Arnold R. Weber, Frank M. Cassell, and Woodrow L. Ginzberg (eds.), <u>Public-Private Manpower Policies</u>, Industrial Relations Research Association, Madison, Wisconsin, 1969, p. 192.

> new workers actually an inexpensive screening device which has the additional effect of reducing the number of potential applications from minority groups.[14]

The Somers and Fernbach study (and others reported in the above surveys) seem to indicate that for some reason employers appear willing to pay higher wages to vocational education graduates than to other graduates. That quality for which vocational education graduates receive higher wages, however, does not appear to be specific, job-related skill, as indicated above. There are at least two possible alternative explanations. First, as Kaufman suggests, the technique of vocational education may provide an effective medium for conveying generalized job skills (say, satisfactory competence in math and communication); second, "the reluctance of many persons in vocational education to accommodate..."[15] the disadvantaged student may result in the vocational education graduate's wages appearing relatively high because those against whom he is being compared have been screened out of college, often screened out of vocational education, and, because of race or other labor market handicaps, are likely also to be screened out of the more attractive labor market opportunities.

The large differential paid to the graduates of junior colleges and post-secondary vocational programs (especially the former) may, to some extent, be

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14/ Manpower Agenda for America, McGraw-Hill, New York, 1968, pp. 100-101.

15/ National Advisory Council on Vocational Education, "Vocational Education: The Bridge Between Man and His Work," in Notes and Working Papers Concerning the Administration of Programs Authorized Under the Vocational Education Act of 1963, prepared for the Subcommittee on Education, Committee on Labor and Public Welfare, U.S. Senate, Ninetieth Congress, Second Session, U.S. Government Printing Office, Washington, D.C., 1968, p. 263.

Three members of that Advisory Council have also written: "The past attitude, as reflected in vocational education's participation in the Manpower Development and Training Act, has been: 'We have to serve our traditional customers first, but give us extra money and we will use it for the disadvantaged'," op. cit., "Education for Employment: The Background and and Potential of the 1968 Vocational Education Amendments."

A survey of 29 State vocational education plans for fiscal 1970 indicated that only approximately 13 percent (an average, unweighted, of state percentages) of the vocational education enrollees are "disadvantaged." The U.S. Department of Labor's 1970 Manpower Report of the President (U.S. Government Printing Office, Washington, D.C., p. 68) states that only 3 percent of vocational education students were disadvantaged in 1968. Fernbach and Somers' cross-sectional sample indicated that only 8 percent of secondary vocational education students are black (op. cit., p. 14).

accounted for by America's "credentials mentality" (plus ability and motivation differentials). Little's comment above reflects this likelihood, as does the work of Diamond and Bedrosian, at New York University,[16] and W. Halder Fisher of Battelle Memorial Institute. Fisher, for example, reports:

> Skill qualifications seem to be less important than education or personal characteristics for most of the jobs surveyed.... In many of the jobs, skills apparently can be learned quite quickly on the job. In others, no particular skills are needed, but merely the ability to follow instructions.
>
> There are some very important entry jobs, however, (such as key punch, industrial, or office machine operators or typists), in which specific skills are required. Most employers require that these skills be obtained before employment.[17]

While the above evidence questions the importance of specific skill training (at levels below the baccalaureate) to facilitate vertical income mobility, the importance of education per se, as opposed to specific vocational education in particular, in promoting vertical occupational mobility seems well supported. Data from a study by Blau and Duncan[18] as well as that from a more recent study by Oliver C. Moles,[19] confirm the widespread belief that education plays a very important role in determining the level in the occupational hierarchy

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16/ Daniel E. Diamond and Hrach Bedrosian report on their survey of hiring requirements in New York City and St. Louis: "...in seventeen out of twenty occupation-industry groups, years of schooling were unrelated to measures of job performance. These findings suggest that a wide spectrum of industry may be overstating their education requirements." (Industry Hiring Requirements and Employment of Disadvantaged Groups, New York University School of Commerce, New York, 1970, p. 9).

17/ W. Halder Fisher, A Comparative Study of the Employee Skills/Training Acceptable to Employers Under Varying Degrees of Labor Market Stringencies, Battelle Memorial Institute, Columbus, Ohio, 1968, p. 85.

Robinson Hollister refers to the "ignorance about occupational-educational relationships" as the "major weak point in current manpower methods." A Technical Evaluation of the Mediterranean Regional Project, Organization for Economic Cooperation and Development, Paris, 1967, p. 80.

18/ Peter M. Blau and Otis Dudley Duncan, The American Occupational Structure, John Wiley and Sons, New York, 1967.

19/ "Up From Poverty: Intergenerational Movement Out of Low Income Occupations," Welfare in Review, May-June 1970, pp. 8-16.

to which one will be first admitted,[20] although education fails as a strong predictor of subsequent jobs. In addition to his conclusion that education influences the first job, Moles concludes that because 66 percent of farmers sons and 73 percent of the sons of laborers[21] and service workers held jobs above the levels of their fathers, the theory that poverty begets poverty is disputed. What he fails to point out, however, is that while the sons of farmers and laborers moved higher in the absolute occupational hierarchy, the sons of those in more exalted occupations may also have moved beyond the job levels held by their fathers. In other words, what may have taken place is an overall shift up the fixed occupational structure for all sons relative to their fathers' positions, with a tightening up at the top and no overall change in relative status: the sons of the poorest may now themselves be the poorest.[22]

One report of State vocational graduates' success in the labor market suggests four additional factors that might be taken into consideration in promoting the vertical economic success of graduates: (a) structure of vocational programs, (b) whether the programs are conducted in public or private institutions, (c) whether the programs are geared to more lucrative positions that may lie outside the local/State planning area, and (d) the clientele the programs are designed to serve. As shown in Table 29, the OTIS project in Okalahoma reports that the success of graduates from vocational school programs appeared to vary considerably based on whether the program was public or private and also on its type. The differences do not necessarily indicate that the public programs are less effective (although that is certainly possible); the private program enrollees, for example, could be a more talented group.[23] Another

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[20] While Moles' data indicate, contrary to Bla[illegible] and Duncan, that "first job" is a more important determinant of mobility than education, their data also indicate that education is the most important predictor of first job, particularly in the case of laborers or service workers.

[21] These percentages were similar to those of Blau and Duncan.

[22] Vertical mobility of vocational graduates conceivably could be measured through a socioeconomic index much like that of Otis Dudley Duncan, which is based on the National Opinion Research Center's index of occupational prestige, plus income and education correlated with these occupations. See Duncan, "A Socio-economic Index for All Occupations," in A.J. Reiss (ed.), Occupations and Social Status, Free Press of Glencoe, New York, 1961.

[23] Although the 1963 Vocational Education Act states specifically that its money may be spent to provide vocational education training through public as well as private programs, the private sector may be underutilized. The Report on Proprietary Vocational Schools by the House Republican Task Force on Education and Training, House Republican Conference, August 12, 1970,

probable explanation of the income differences might be that more of the private programs are post-secondary.

TABLE 29.—Comparative median yearly salary of prospective May 1969 vocational graduates: Oklahoma, 1969

Programs	Public school	Private school
Technical and trades and industry	$4,000	$6,400
Business and office . .	3,600	4,000
All programs.	3,800	5,400

Source: Paul V. Braden, James L. Harris, and Krishan K. Paul, Occupational Training Information System, Oklahoma State University, Research Foundation, Stillwater, 1970, estimated from the graphs on page 103.

The fact that approximately 20 percent of the private students leave Oklahoma for employment, as opposed to 5 percent of the public students, may also help account for some of the foregoing differentials. Table 30 reflects these differentials and indicates that out-of-state opportunities should be given serious attention in planning; such opportunities, of course, will be more important when the State contains a large depressed area in which attractive opportunities may be very scarce.

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indicates that "About 70 percent of those entering proprietary vocational schools complete their training, as compared with only 30 percent to 40 percent of community college students." Investigation by the United Business Schools Association has yet to unearth a single instance in which the facilities of a private business school have been utilized to carry out a program under contract. (Richard A. Fulton, "Review and Comparison of the Legislative Background and Administrative Implementation of Federal Education Programs Which Authorize, Under Contract, Training for the Conduct of Programs in Independent Schools," reprinted from Hearings Before the General Subcommittee on Education of the Committee on Education and Labor, House of Representatives, Ninetieth Congress, Second Session, on H.R. 15066, "A Bill to Amend the Vocational Education Act of 1963, and for other purposes." Hearings held in Washington, D.C., on February 20, 21, March, 5,6,7,11,14,18,19,20,21, 1968.)

TABLE 30.—Comparative median yearly salary of prospective May 1969 graduates from public vocational and technical programs: Oklahoma, fall 1969[1/]

Program	All grads placed in nontraining-related jobs (1)	Grads in training-related jobs in Oklahoma (2)	Grads in training-related jobs out-of-state (3)	Difference between related in- and out-of-state (3-2) (4)
Technical . . .	$4,500	$5,700	$6,600	$ 900
Trade and industrial . . .	3,400	3,750	5,900	2,150
Health	<3,000	4,250	4,100	-150
Business and office	3,400	3,800	4,200	400
Agriculture . . .	3,700	3,700	4,000	300
Distribution and marketing . . .	3,500	3,250	3,300	50
All programs . . .	3,500	4,100	4,700	600

[1/] Data estimated from bar graphs. No correction made for relative wage levels between Oklahoma and States where "migrators" located.

Source: Paul V. Braden, James L. Harris, and Krishan K. Paul, Occupational Training Information System, Oklahoma State University, Research Foundation, Stillwater, 1970, p. 96.

The data in Table 30 are for one State only and are not intended to represent national averages. They should make clear, however, the importance of considering other than local criteria in planning and placement. Generally there appears to be relatively little geographic mobility among vocational education graduates.[24] It is entirely conceivable that if vocational education planning utilized nonlocal as well as local labor market criteria, the vertical and geographic mobility of graduates might be considerably enhanced.

Another index of vertical mobility could be the degree of job satisfaction attained by program graduates. Kaufman and his associates discovered that the job satisfaction achieved by vocational education graduates was about the same as that of the graduates from the academic and general curricula.[25] Eninger's nationwide survey of trade and industrial graduates reported that vocational graduates did not experience significantly higher degrees of job satisfaction than academic graduates. Among the vocational graduates only, however, graduates promptly placed in training-related jobs tended to report greater job satisfaction over all jobs held during their period of employment.[26] The more jobs the graduate held related to his training, the greater was his job satisfaction. To repeat, however, in Eninger's words, "Vocational graduates have a higher, but not significantly higher, mean job satisfaction rating;"[27] and, as Little indicates, the evidence of job satisfaction is "fragmentary and sporadic."[28]

24/ Paul V. Braden, James L. Harris, and Krishan K. Paul, Occupational Training Information System, Oklahoma State University, Research Foundation, Stillwater, 1970, p. 34; Max V. Eninger, The Process and Product of T&I High School Level Vocational Education in the United States: The Product, American Institute for Research, Pittsburgh, 1965, pp. 12-2 to 12-9; L. Kenneth Little, op. cit., pp. 22-23; Arthur J. Corazzini, "The Decision to Invest in Vocational Education: An Analysis of Costs and Benefits," Journal of Human Resources, Supplement, 1968, p. 119.

25/ Jacob J. Kaufman, Carl J. Schaefer, and associates, The Preparation of Youth for Effective Occupational Utilization: The Role of the Secondary School in the Preparation of Youth for Employment, Pennsylvania State University, University Park, 1967.

26/ Eninger, op. cit., pp. 3-31 to 3-33 and 9-25 to 9-31.

27/ Ibid., p. 9-30. This is quoted for clarity, because Little states (p. 25) that Eninger reports vocational education graduates had higher degrees of job satisfaction than graduates from other curricula.

28/ Little, op. cit., p. 24.

One of the new concerns in vocational education is that early introduction of the child to the world of work may make a significant and positive contribution to his employment satisfaction and success.[29] There is empirical evidence to support the probable benefits that might come from such an educational program. A longitudinal labor market survey of male youths 14-25 years of age, by Parnes, Miljus, Spitz, and associates, concludes that "labor market information provides a significant payoff to the individual."[30] Table 31, from the survey report (p. 137) compares labor market knowledgeability with earnings. Although the table is gross in the sense that it does not control for other variables, such controls will be reported in future publications from the study.

TABLE 31.—Mean hourly rate of pay, by score on occupational information test

(Employed male blue collar workers 20-24 years of age, not enrolled in school)

Score	Whites	Blacks
Low . . .	$2.33	$1.63
Medium. .	2.55	2.14
High . . .	2.77	2.29

OBJECTIVE 2: PROVIDE TRAINING THAT WILL FACILITATE HORIZONTAL GEOGRAPHIC AND OCCUPATIONAL MOBILITY TO SECURE OPTIMAL UTILIZATION OF APTITUDES

Summary of Findings

a. There is only limited evidence that vocational education can attract industry to depressed areas; thus vocational education should prepare students for migration if they so desire.

29/ National Advisory Council on Vocational Education, Vocational Education: The Bridge Between Man and His Work, pp. 360-361 and 368. See also the subsequent 6-month reports.

30/ Herbert S. Parnes, Robert C. Miljus, Ruth S. Spitz, and associates, Career Thresholds: A Longitudinal Study of the Educational and Labor Market Experience of Male Youth 14-24 Years of Age, Ohio State University, Center for Human Resource Research, Columbus, 1969, p. 138.

b. Vocational education graduates do appear to have horizontal occupational mobility. In Somers and Fernbach, 31 percent of secondary vocational education graduates took unrelated jobs and were paid more than those taking related jobs.

c. A survey of agricultural education students' interests and job knowledge would be valuable.

Elaboration of Objective

Horizontal geographic and occupational mobility potential are conceived as objectives for vocational education because the changing industrial structure of the nation offers little assurance that job change, in geographic and occupational terms, will not continue to be a central part of our society. As Hansen has pointed out, "...there is no convincing evidence that central government programs can attract enough industry to the countryside to provide people everywhere with jobs in proximity to their places of residence." 31/

In addition to the need for geographic mobility potential (to enable escape from depressed areas), occupational mobility potential is also needed to enable displaced workers to adjust easily to hiring and task requirements in a new job, if through technological or industrial change they are forced to assume new positions. The importance of occupational flexibility—or, potential mobility—has been recognized by the National Advisory Council on Vocational Education:

> "...we must not only equip the worker with an occupational skill, but must also develop his flexibility and adaptability—in improving his skills in his present occupation, in keeping up with technological advances which affect his work, and, if necessary, in learning entirely new occupations so that he can change his occupation, industry, or even residence in order to adapt to the changing demands of the job market."32/

Providing such mobility, flexibility, or adaptability to the student enables him, and the economy, to better adapt to the process of change.

31/ Niles M. Hansen, "Regional Development and the Rural Poor," Journal of Human Resources, Spring 1969, p. 214. Hansen quotes from a well-known study of labor mobility by Lansing and Mueller: "Educational and vocational training efforts are sorely needed to maintain or improve the quality and also the mobility potential of the labor force in redevelopment areas." (John B. Lansing and Eva Mueller, The Geographic Mobility of Labor, University of Michigan, Institute for Social Research, Survey Research Center, Ann Arbor, 1967, p. 322.)

32/ Vocational Education: The Bridge Between Man and His Work, p. 338.

Ideal Data

Ideally one would continue to supply the student with skills enhancing his flexibility until the marginal cost of providing each type of skill were equated with its marginal benefit (if training resources were unlimited; otherwise, until the ratio of marginal benefit to marginal cost were equal for all programs). Lacking such data, one might examine the skills most common to the occupations into which individuals of given aptitudes might enter. The ability to read a newspaper might be an essential type of training for one of modest talents, while solidification of basic arithmetic competence might be more critical for one with low verbal but moderate mechanical aptitudes.

Vocational educators in depressed areas need to know the occupational opportunities open to their graduates locally as well as outside their own labor market. From regional manpower data they may then begin to analyze the skill components—in the broadest sense of mechanical as well as "academic" skills—of those possibilities facing their youth.

The analyst of the vocational education system needs to know how well those trained in the various curricula are doing locally as opposed to those who leave their home towns. The socioeconomic and aptitude characteristics of each group would be important. Success, of course, should be measured in economic as well as noneconomic terms. The analyst will also want to know the geographic dispersion and occupational distribution of job openings for graduates, to be juxtaposed with actual student output and the benefits and costs from each training program.

Because some vocational programs are based on the belief that trained manpower attracts industry, data on the ability of pools of vocational skills to attract industry would be very useful.[33]

Actual Data and Assessment of Achievement

As the Hansen quote above indicates, evidence that industry may be attracted to the countryside is meager. Although the data indicate that vocational education graduates are generally rather immobile geographically, they do move apparently to take advantage of economic opportunities, as illustrated in the Oklahoma example (p. 99ff). Occupational mobility with respect to training is indicated in the Somers and Fernbach report: 31 percent of the secondary vocational education students took jobs completely unrelated to their training.[34]

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[33] Some State vocational education planning documents have as part of their rationale the ability of such programs to attract industry. It is important to remember that location of an industry in one area means that it does not locate in another. Given the decision to build the plant, the value added by the plant in A is social gain; however, the firm may not have chosen the "best" site among all available; thus gain may not be maximum.

[34] Of the junior college and post-secondary vocational education students, 10 percent and 7 percent, respectively, took jobs totally unrelated to their training. (Somers and Fernbach, op. cit., p. 46.)

Further, employers apparently recognized them to be as valuable in unrelated jobs as in the related, since those in unrelated jobs were paid significantly more per hour (9¢), significant at the 5 percent level).

Some general parameters of the mobility problem are known, but it is not known how many students would have moved to better opportunities had they received another type of training—say, electronics rather than agricultural education. If all states began to provide information on internal and external earnings received by their graduates, as Oklahoma has done, this would begin to provide planning priorities for the students and the school administrators.

An important vocational education objective is to retrain or provide upgrade training to adult workers who experience labor market difficulties. A study by Greenleigh Associates, however, notes that the offerings of adult vocational education are not appropriate to the training needs of the disadvantaged. "Much of the adult effort was for secretarial training or technical refresher courses, and the tuition or fees charged often made enrollment "difficult or impossible for the poor."[35]

OBJECTIVE 3: ENHANCE THE QUALITY OF AMERICAN LIFE THROUGH A MORE EFFICIENT ALLOCATION OF RESOURCES AND NET CONTRIBUTION TO GROSS NATIONAL PRODUCT AND/OR OTHER INDICATORS OF SOCIAL AND CULTURAL GROWTH

Summary of Findings

a. It is critical that vocational education and manpower programs train people for jobs that otherwise would have gone unfilled, since the displacement effect minimizes net impact on GNP and labor supply.

b. Research on the net economic growth impact of education, much less vocational education, is inconclusive.

c. The GNP is only a crude index of social welfare.

Elaboration of Objective

Vocational education may be thought of as simply one component within the entire educational system, with basic objectives not unlike those of courses in mathematics, English, or sociology: to prepare the student to contribute constructively to the national life and to enable him to take

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35/ Opening the Doors: Job Training Programs, Part One—Recommendations and Summary Findings, Greenleigh Associates, New York, 1968, p. 91.

advantage of the opportunities he meets. A talented and flexible labor force is better able to supply the nation with necessities—food, housing, or national security—as well as those forms of goods and services that enhance the quality of life, such as music, recreation, or theater.

Ideal Data

Ideally, one would have information on the impact of vocational education, and other investments, on the quality of life measured by a summary index that takes into consideration economic as well as noneconomic benefits. Gross national product, unfortunately, cannot alone serve as this summary index: a fair proportion of GNP reflects the extent of our social, ecological, and political problems. Expenditures on national defense, antipollution devices, and police increase in relation to those difficulties, and it is only in response to crises that these expenditures are necessary. To consider that we are better off because we have a larger police force is misleading; we would be still better off if we did not have the need for such expenditures, and to equate them with recreation expenditures is a dubious calculation. The dollar spent on police is not a net social gain in that it merely reflects an increase in social friction.[36]

The ideal index would measure the impact of education or social (such as mass transit) expenditures upon social coehsion, rapport, satisfaction, security, development, etc. Such an index would reflect crime rates, job security, consumption, intellectual and cultural vigor, etc., but we are a long way from the ideal. Given such an index, one would want to know the impact upon it of alternative educational decisions.

Actual Data and Assessment of Achievement

Even if one accepts GNP as an appropriate index, research concerning the net social impact of vocational education upon GNP is inconclusive. One of the basic problems in such research is pointed up in the 1970 Manpower Report of the President.[37] That analysis states that to accurately assess the impact of a manpower program, such as vocational education, one must not only have a control group (as most analytical studies have), but one must also take account of the fact that the control group will not represent the entire labor force and consequently a displacement of substitution effect—of vocational education graduates for those with fewer credentials—may take place. The displacement effect will knock some of the less attractive candidates off the employment ladder. In other words, to assess the net contribution to employment and GNP, or net employment effect, one must consider: initial placements of graduates

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36/ Kenneth E. Boulding discussed the weaknesses of GNP as our calculus of national welfare at the 1970 American Statistical Association convention. He noted that GNP reflects the production of "bads" (e.g., pollution and crime) as well as "goods."

37/ pp. 16-18.

and dropouts obtaining jobs through receipt of training, compared with:

- Trainees who lose jobs because of inadequate training
- Control group success rate
- Displacement effect.

Multiplication of this short-run employment effect by appropriate incomes will reflect the net short-run impact upon the economy.

Unfortunately, in the words of the above Manpower Report, "This question is largely unanswered on an economy-wide basis." The coefficients for such calculations are unknown, but the Manpower Report does highlight the importance of training people for relatively critical occupations: if the jobs would otherwise have remained vacant, there is no aggregate displacement effect, i.e., trainees are not merely substituted for nontrainees.

If one is willing to accept as the net impact on the economy the above considerations exclusive of the substitution/displacement problem, then it appears quite clear that vocational education graduates have been doing relatively well compared to the control groups utilized in most analyses. However, if one wants to be more rigorous, there are numerous reasons for remaining agnostic with regard to the net impact of vocational education on the economy. In addition to the above displacement problem, and that of a shortage of data pertaining to vocational education's production function and actual output, other problems facing the analyst of the returns to education are so severe that one such scholar reported, "It is becoming more and more difficult to reconcile any conclusion with the evidence, and this is the mark of progress."[38]

OBJECTIVE 4: IMPROVE THE NET FISCAL POSITION OF GOVERNMENTS BY IMPROVING TAX COLLECTIONS RELATIVE TO DISBURSEMENTS

Summary of Findings

a. To the extent that vocational education facilitates and enhances the probability of job acquisition, it will increase taxes paid and cut down on welfare expenditures for those who enter the work force as a result of training.

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[38] William G. Bowen, "Assessing the Economic Contribution of Education: An Appraisal of Alternative Approaches," in Seymour E. Harris (ed.), Economic Aspects of Higher Education, Organization for Economic Cooperation and Development, Paris, 1964, p. 200.

b. Reduction in the cost of delinquency and crime may also be attributable to vocational education. Although the precise dimensions of this benefit are uncertain, when a youth—because of his skill or understanding of the world of work—takes a job rather than turning to delinquency, the social cost of crime detection, detention, and prevention fall, which also contributes to net fiscal resources.

Elaboration of Objective

The focus of this objective is the belief that if training increases the net employment of people who otherwise would have been on welfare or unemployed, then public expenditures on welfare, detention, and crime prevention will fall while tax revenues from the newly employed will rise.

Ideal Data

Comparison of similar vocational and nonvocational education cohorts is required to determine the extent to which each is a net contributor to and consumer of fiscal resources. One would need controls in addition to socioeconomic and aptitude variables; however, one of the likely reasons people enroll in vocational education programs is that they plan to be economic contributors to society. In other words, those who do not intend to join the labor force are less likely to enroll in vocational education programs (other than home economics). These prospective nonworking mothers, delinquents, and social dependents would provide a downward bias to, presumably, the nonvocational education contribution to fiscal resources. To rephrase the problem, one would need to determine what portion of those within the general and academic curricula should be considered as labor force candidates to be compared with the vocational education graduates. Having isolated the intent to work variable, one would then determine the extent to which such cohorts contribute to and consume government funds.

Actual Data and Assessment of Achievement

Very little is known about the relationship between vocational education and delinquency (see also discussion of Objective 6). It cannot be determined at this stage whether vocational education minimizes delinquency. The relationship between education and crime is uncertain, and the extent to which the data might mislead the researcher is unknown.

Other costs drawing on net fiscal resources would be the welfare expenditures that might be consequent to inability to obtain a job. Thus, a part of society's benefits from a vocational education program will be reflected in reduced welfare costs for those enabled to get otherwise inaccessible jobs, assuming there are no offsetting "displacement effects."[39] In addition,

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[39] See U.S. Department of Labor, Manpower Report of the President, 1970, pp. 16-18.

there will be an increase in taxes paid due to higher incomes, these two being somewhat offset by the costs of the vocational education program tax. The benefit-cost section of this task force report discusses these relationships in more detail.

OBJECTIVE 5: IMPROVE THE QUALITY OF THE LABOR FORCE AND THEREBY ENHANCE THE SUPPLY OF APPROPRIATELY TRAINED LABOR

Summary of Findings

a. Vocational education cannot, for the most part, be distributed by industry.

b. Using wage and monthly earnings as the index, junior college graduates appear to be preferred by industry—apparently because they obtained more general academic training.

Elaboration of Objective

The quality of economic life in a society will be partially determined by the quality of its labor force, in terms of composition and depth of talents. Vocational education is seen as one determinant of talents, as one ingredient in a complex manpower training system that includes all levels of education, from primary to post-graduate, and all tracks, from on-the-job training to military training, apprenticeship, and vocational education per se.

Ideal Data

Ideally one would be able to determine the net contribution of vocational education to the supply of labor, after netting out the effect of similar inputs from on-the-job training, apprenticeship, military, "academic," and other manpower development programs. Such an analysis would require estimation of the interaction effects between the supply of vocational education graduates and the supply of labor from other sources. In other words, the vocational education output will offset the supply of other forms of manpower. The greater the supply of appropriately trained manpower coming from the school system, the less the need for on-the-job training, for example.

To do a competent analysis of the supply of skilled manpower, one needs both indices of the quantity of output from various training routes and information concerning the quality of that manpower. Is the vocational education graduate the equivalent of one who has completed 2 years of apprenticeship? Is the vocational education graduate with three courses in auto mechanics substantially less skilled than one with five? What kinds of financial incentives are offered to the vocational education graduate reflecting the fact that his training is more valuable than that of the less expensive general or academic curriculum graduate?

Additional basic information that would be needed would be simply the output of graduates by specific training program, USOE curricular classification,

or occupation for which they are being prepared. To group graduates from "LPN" and "Nurse Aide" programs together is to confuse two significantly different forms of manpower, in terms of prospective wages as well as value to the health industry.

Another component of the training production function is the extent to which industries would be willing to train within their facilities through subsidization of on-the-job training or cooperative work experience programs. One test of the value of training to employers would be to require that they pay some portion of the cost of training to the youths they employ. This might be, say 50 percent of the training costs or first-year wages (above some minimum) paid directly to the training institution over a period of 5 years.[40] One advantage of such a tax would be to reward the institutions doing a relatively effective job of training.

Finally, one needs to know the context into which program graduates will be placed. In an area where unions completely control the labor market and are willing to admit only relatives of electricians into their apprentice programs, and where youth would prefer other local jobs to migration, it makes little sense to continue to train electricians.

Actual Data and Assessment of Achievement

An attempt was made to distribute vocational education graduates by industry, but data problems proved insurmountable in the short run. For example, of the 3.8 million students in secondary vocational education in 1968, 1.1 million were in business and office occupations, 0.1 million were in "off-farm agriculture" training,[41] and 1.2 million were in home economics programs other than "gainful."[42] If one subtracts the nongainful home economics training from the total, this leaves a total of 2.6 million students in gainful training for all "service" or program areas. It is impossible to distribute the business and office and off-farm agriculture graduates (46 percent of all graduates) by industry, even if they take training-related jobs, and probably only half of the remaining graduates will take jobs in occupations related to their training, making estimates of the industrial destination of graduates quite

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40/ One should not expect the employers to bear the full cost of training, for there are obvious external benefits. Society would benefit through higher tax receipts, lower welfare payments, a more satisfied work force, etc.

41/ USOE, Vocational and Technical Education Annual Report—Fiscal Year 1968, U.S. Government Printing Office, Washington, D.C., p. 126.

42/ The 1.2 million "other than gainful" was estimated by assuming all gainful programs were secondary, and that the rate of increase in "gainful" training for 1966 to 1968 was similar to the rate for 1965 to 1966 (19.5 percent per year). (National Advisory Council on Vocational Education, Vocational Education: The Bridge Between Man and His Work, p. 109.)

hazardous.[43] In other words, the problem of relating occupations to industries is compounded by the fact that significant proportions of students do not take jobs for which they were explicitly trained.

One possible source of data pertaining to the quality of vocational education training would be the scores of vocational education graduates on civil service (State or national) examinations as compared to the scores of other graduates. This would provide a quality index and possibly, depending on the other data held in the civil service records, a comparison of public versus private training programs.

A study of tool and die makers in Boston concludes that "Only one path, vocational high school combined with apprenticeship, scored high on most measures of effectiveness," effectiveness being measured in terms of performance and duration of training.[44] While this does not negate the value of vocational education to this critical occupation, neither does it confirm it. For a rigorous test of the efficiency of vocational education in preparing such craftsmen, one would need to examine the entire vocational education machinist training cohort to see what happened to those who did not become tool and die makers.

As indicated above, a thorough assessment of vocational education's role in the training system would include an assessment of the scope, magnitude, and quality of on-the-job training through picking up a trade through one's coworkers, up-grading on-the-job as a deliberate policy, and company training programs other than at the customary work site. The efficiencies and

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[43] A 1966 survey of vocational education students in cooperative and preparatory programs indicated that out of 607,000 who completed programs, only 275,000 took training-related jobs, or less than half of the 57 percent available for placement. The training-related placement rates varied by program from 92 percent (health) to 67 percent (agriculture). (National Advisory Council on Vocational Education, Vocational Education: The Bridge Between Man and His Work, p. 128.) A spring 1969 survey of vocational education students (secondary and post-secondary, the latter probably providing an upward bias) completing that year indicated that only 44 percent planned to take jobs related to their fields of training (9 September 1970 memo from Robert Calvert, Jr., chief Adult and Vocational Surveys Branch, National Center for Educational Statistics, to Susan Grace, HEW/Evaluation and Monitoring. The memorandum contained data for a report (specifically Table 24 of the report) by Evelyn R. Key, Vocational Education: Characteristics of Teachers and Students, to be published by USOE, Adult and Vocational Education Surveys Branch.)

[44] Morris A. Horowitz and Irwin L. Herrnstadt, The Training of Tool and Die Makers, Northeastern University, Department of Economics, Boston, 1969, p. 1.

other dimensions of those approaches to training, as opposed to the alternatives of vocational education, apprenticeship, correspondence, etc., are largely unknown, primarily because of the complexity of the analytic task.[45]

The data in the Somers and Fernbach study, cited previously, indicate the value of vocational education to industry, if one can assume that the starting wage reflects the value of the student and his prior training to industry. The starting and current wages of graduates from secondary vocational education programs do not differ significantly from those of the academic graduates (who serve as the control group for secondary, post-secondary, and junior college vocational education graduates).[46] Both the post-secondary and junior college graduates experienced significantly (at 1 percent level) higher wages, but the junior college group was the only one with a significantly higher increase in wages (25¢). As mentioned earlier, however, the fact that employers paid more when the students took jobs unrelated to their specific training leaves the investigator wondering whether the employer buys the skill provided through training or buys a general competence represented by the certificate received upon graduation. Among the vocational program areas, health and technical programs had the only significant (1 percent) positive impact upon wages, while distributive education had a net negative impact (significant at 5 percent level).

Analysis of the portion of time employed yielded results conflicting with those for wages; therefore, average monthly earnings were examined by Somers and Fernbach.[47] As related earlier, earnings increased with secondary vocational education, post-secondary training, and junior college (the increases were, respectively, $56, $83, and $198 per month over the secondary academic control group's earnings). Clearly, it would have been useful to have another control group here, namely, post-secondary or junior college academic. The latter may be a less expensive form of post-secondary education against which the more expensive forms should be compared. Comparisons between program

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45/ See U.S. Department of Labor, Manpower Administration, Work Force Adjustments in Private Industry—Their Implications for Policy, Manpower Automation Research Monograph No. 7, U.S. Government Printing Office, Washington, D.C., 1968; and Gerald G. Somers, John Baum, and Myron Roomkin, Pilot Feasibility Study of Training in Business and Industry, Industrial Relations Research Institute, Madison, Wisconsin, January 1970.

46/ Op. cit., p. 73. These relations appear in a multivariable analysis controlled for other factors such as sex, father's education, etc.

47/ Secondary health training had a negative impact upon time employed. Relatedness of job to training had a positive impact. Secondary distributive education's impact was again negative. But none of these relations was significant. Only junior college, among the program variables, was significant, and these graduates were employed 17 percent more than secondary

areas were insignificant, except when secondary graduates alone were examined. Among that group office occupation students were paid significantly (1 percent) more than the academic students, as were the technical graduates (5 percent) though the latter program added somewhat less ($68) to earnings than the former ($77).

These analyses face the same kinds of difficulties referred to earlier. Costs of the education are not considered at all. One would prefer that variables such as academic and mechanical aptitude were utilized, which would have enabled some comparison of the secondary academic group with the other subgroups, for quality. While there is a control group, one remains uncertain about the displacement effects of the junior college program—for example, to what extent does it simply push others down and off the employment ladder because certificates are considered indicators of aptitude?[48] One must also inquire concerning the effect upon on-the-job training as a result of these programs. Generally, vocational education within the junior college enabled its graduates to earn significantly higher economic benefits, apparently because the junior college provides more general academic achievement.[49]

OBJECTIVE 6: "KEEP THE KIDS OFF THE STREET" BY OCCUPYING THEIR TIME CREATIVELY UNTIL THEY ARE READY TO PARTICIPATE AS RESPONSIBLE MEMBERS OF SOCIETY—WITHIN OR OUTSIDE THE LABOR FORCE

Summary of Findings

a. Approximately 50 percent of the vocational and agricultural curricula students are from the lowest ability quartile.

b. Only the commercial curriculum seems to be an effective dropout prevention instrument. In the lowest ability quartile, 26 percent drop out from the general curriculum, 30 percent from the vocational, and 40 percent from the agricultural.

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vocational graduates. These data, on wages and percent of time employed, included among their population those who were pursuing additional education after graduation, which distorted somewhat the impact upon the dependent variable; e.g., additional education had a negative impact upon employment, a relationship unlikely to persist after permanent entry into the labor market, pp. 80-88.

48/ See Objective 4 discussion.

49/ Somers and Fernbach, op. cit., p. 106. Whether junior college is a worthwhile investment is considered in the section of this report which discusses the costs and benefits of vocational education.

c. None of the curricula appears to serve the low-ability student well, if dropout rates may be used as the index.[50]

d. Depending on the occupation they select, dropouts may be acting in their economic best interest by dropping out, both at the secondary and post-secondary levels.

Elaboration of Objective

This objective is often seen as based upon two principle concerns. First, it is assumed that unless a youth completes high school he will not be able to compete effectively within the labor market. Strong aggregative correlations tend to support this belief. Second, people often believe that if youth are not in school they are up to mischief, so that even if the school does not perform an educational function, at least it provides "babysitting" service which, although expensive, costs less than placing similar numbers of youth in detention homes.

Ideal Data

Ideally, one would have a thorough set of follow-up data on dropouts and a similar cohort of graduates. Such data would include indices of aptitudes (say mechanical, math, verbal, etc.), socioeconomic background, urban-rural and regional descriptions, etc. Indices of labor market success would be imperative, including wages, stability of employment, starting and current earnings, and job satisfaction.

In addition to these standard items for vocational education appraisal, one would also need to know the delinquency records of such youth, although accurate records in this area may be extremely hard to obtain.

Concerning the effectiveness of particular dropout prevention programs, one would need to compare dropout rates in that school (or school program) with dropout rates in another school (or school program) identical in all other characteristics. Otherwise one encounters the problem of simultaneous changes (e.g., it may not have been the dropout prevention program, but rather, say, a loosening up of the labor market that was responsible for the rate change).

Actual Data and Assessment of Achievement

As a rough proxy for the ability of vocational education to keep youth off the streets, labor market indices will again be used. Other data would be very costly, and it does not seem entirely unwarranted to assume that the

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50/ One must recognize, of course, that dropout rates might have been higher if students had been forced into curricula in which they were less interested. One must also recognize that dropouts may reflect a very efficient program, a program that facilitates successful job entry before graduation.

relationship between delinquency and labor market success for dropouts is similar to the relationship between delinquency and labor market success for graduates. Presumably, if the dropout is employed successfully (in terms of income and job satisfaction), we will be no more concerned about him than about the graduate who is employed successfully.[51] Unemployment in the ranks of both dropouts and graduates constitutes a major social as well as economic predicament.

Vocational education programs tend to enroll students of relatively low ability as measured by tests of verbal, math, and general knowledge; visual reasoning; etc. Howard Vincent reports unpublished Project TALENT data indicating that 78 percent of the vocational students, 87 percent of the agricultural students, and 67 percent of the commercial students are below average in ability according to their test scores.[52] Table 32, using 1960 data from the Vincent report, compares students' ability levels by type of high school program.

TABLE 32.—1960 tenth graders
(male and female)

High school program	Total	Ability quartile			
		Low	II	III	High
General	100%	34%	23%	24%	14%
College prep . . .	100	9	13	28	51
Commercial . . .	100	35	32	26	8
Vocational . . .	100	48	30	18	4
Agriculture . . .	100	56	31	11	3

51/ Following the Detroit riot, the typical Negro prisoner was a high school dropout (by 11th grade) who had been a blue-collar worker earning about $120 a week. The high school graduates, however, did not fare very much better than the dropouts. The two groups were equally likely to have earned more than $120. Dropouts were more likely to have earned less than $80. (U.S. Department of Labor, Manpower Administration, A Profile of 500 Negro Males Arrested in the Detroit Riot: Supplement, Manpower Administration, Washington, D.C., 1967, pp. 47-51.) It is also true that a large proportion of the identified criminal population is without job skills, but the relationship between vocational education and criminal life is a fragile one, and the task force is unaware of data indicating that vocational education prevents criminal activity.

52/ Howard L. Vincent, An Analysis of Vocational Education in our Secondary Schools (revised) unpublished report prepared for USOE, Office of Program Planning and Evaluation, July 1969, p. 27.

In view of the trend suggested in Table 32, the vocational programs should be effective in retaining students of lower ability. Evidence indicates, however, that vocational education dropout rates are relatively high. When the rates are examined by curriculum and ability level one finds that for the lowest ability quartile only the commercial curriculum is doing better than the general or college preparatory curricula. Roughly half of the vocational and agricultural students are in the lowest quartile, and among these, 30 percent of the vocational and 40 percent of the agricultural students drop out. Table 33 gives enrollment figures for secondary vocational education in FY 1968, by program and grade level. Although the table includes no breakdown by ability level, it shows the overall enrollment pattern for agriculture and home economics contrasting sharply with the pattern for the other curricula. Enrollment in agriculture and home economics is significantly less in the senior year, while the others reach peak enrollment in the senior year.

TABLE 33.—Enrollment in secondary vocational education, FY 1968[1/]
(000)

High school program	Grade level			
	9	10	11	12
Agriculture . . .	169.0	139	119	101
Distributive . . .	0.7	9	65	101
Health	0.2	3	6	13
Home economics . .	555.0	352	296	355
Office	52.0	192	370	446
Technical	0.9	8	12	15
Trades and industry	18.0	83	154	167
Other	16.0	2	6	18

[1/] No correction made for the fact that not all of the programs compared are of the same length.

Source: USOE, Vocational and Technical Education Annual Report—Fiscal Year 1968, U.S. Government Printing Office, Washington, D.C., 1970, p. 130.

Vocational education of the commercial and agricultural varieties did tend to serve those in the second quartile considerably better than those in the lowest quartile, in terms of retention, for the dropout rates for the second ability level were notably lower than those for the lowest. Also, these curricula retained more second quartile students than either of the general or vocational curricula. However, dropout rates for all curricula are increasingly related to ability, as shown in Table 34. This would appear to indicate that

none of the curricula (and particularly the agricultural and vocational) is effectively designed to serve and retain the low ability student. Vincent found these relationships continued to hold true even when ability was classified by socio-economic background.[53]

TABLE 34.—1960 tenth grader dropout rates

(1963 follow-up, males and females)

High school program	Ability quartile				
	Total	Low	II	III	High
General.	16%	26%	17%	9%	6%
College prep . . .	4	23	7	2	1
Commercial . . .	13	18	11	9	6
Vocational . . .	22	30	19	9	*
Agricultural . . .	27	40	10	*	*

* Cell size too small for analysis.

Source: Project TALENT data in Howard R. Vincent, An Analysis of Vocational Education in Our Secondary Schools, unpublished report prepared for USOE, Office of Program Planning and Evaluation, Washington, D.C., 1969, p.31.

One of the problems in this analysis is that the students still have not been classified in a way that permits reasonable prediction of dropout rates if students are transferred to other curricula. It might well be, for example, that if the agriculture students had been transferred to other curricula their dropout rates would have been still higher. There may be some motivation (e.g., interest in agriculture plus a need to support the family) and aptitude (say, mechanical aptitude) factors that have not adequately been controlled.

The assumption that students are acting counter to their own economic well-being when they drop out of school needs to be examined. A report of a nationwide follow-up survey of students from vocational-terminal programs in junior colleges (class of 1966, followed up in 1969) concluded, "In summary, the dropout, although holding a slightly lower status job than the graduate,

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53/ Vincent, op. cit., p. 32.

was generally doing just as well with respect to earnings and was satisfied and happy on his job."[54] Another important study has appraised the present value of the fourth year of high school and concludes that "the value of high school graduation is . . . intimately connected with the occupational decision of the individual"; further, "the present value of earnings less direct costs of education of the fourth year of high school are negative for many occupations."[55] Some sample present values of the fourth year of high school, by occupation, using a discount rate of 10 percent, are indicated below:[56]

	White	Nonwhite
Painters, construction, and maintenance	$ 2,586	—
All other clerical and kindred	1,826	755
Mechanics and repairmen	47	—
Shipping and receiving clerks	-959	-4,255
Truck and trailer drivers	-1,495	—
Barbers	-2,023	—
Electricians	-2,255	—

Although probably not aware of these data, the dropouts may have intuitively believed that it was not worth their while to remain in school. Depending on the occupation to which they aspired, this research indicates their decision to drop out may have been economically prudent and satisfying.[57]

These data would seem to emphasize the importance of clarifying to the student or likely dropout the relationship between his education and his job.

54/ Laure M. Sharp and Thelma Myint, Graduates of Vocational-Terminal Programs in Junior Colleges (draft), prepared for the Center for Studies in Vocational and Technical Education at the University of Wisconsin, Bureau of Social Science Research, Washington, D.C., July 1970, p. 143.

55/ Stuart O. Schweitzer, "Occupational Choice, High School Graduation, and Investment in Human Capital," working paper, Urban Institute, Washington, D.C., 1970, pp. 20-21.

56/ Ibid., p. 19.

57/ Michael E. Borus ("Response Error in Survey Reports of Earnings Information," Journal of American Statistical Association, September 1966, pp. 374-5) indicates that dropouts from an MDTA program tended to over-report (inflate) their earnings, perhaps, as he suggests, to "justify" their dropping out.

Dropouts would be categorically excluded from some jobs; for other jobs dropping out would not appear to be an impediment. The data also would seem to underscore the importance of the occupational orientation programs referred to in the discussion of mobility objectives. The youth might be informed that it would be economically prudent to drop out, if he wants to work in a particular occupation, and that the given occupation may bring him a higher income than others for which more training is required. He should also be informed, however, that if he is forced to change occupations, due to technological change or alteration of his career interests, failure to complete high school may then restrict both his vertical and his horizontal occupational mobility.

OBJECTIVE 7: PROVIDE EDUCATION AND TRAINING TO STUDENTS WITH LOW ACADEMIC APTITUDE WHO MAY HAVE NONACADEMIC—E.G., MECHANICAL—APTITUDE

Summary of Findings

a. None of the curricula appears to be effective in retraining the lowest quartile; only the commercial curriculum was able to prevent fewer than 20 percent of this group from dropping out (from 1963 follow-up of 1960 tenth graders).

b. Analysis of those with low academic but higher nonacademic, say, mechanical reasoning ability should be undertaken to determine vocational education's impact upon this group.

Elaboration of Objective

Many believe that since the college preparatory curriculum appears to serve the academically talented relatively well,[58] the vocational education curriculum should be designed to serve those with lesser academic talents.

Ideal Data

The ideal data required for this analysis would be similar to that described for assessing progress in pursuit of previous goals. Students should be classified by socioeconomic background, academic and other interests and aptitudes, curriculum, educational attainment, labor market success, and job satisfaction. The data should be submitted to both multivariate and tabular analyses.

58/ See data in discussion of Objective 6. Also, 40 percent of students in the college preparatory curriculum had finished college 5 years later, as opposed to 7 percent of those in the general curriculum, 7 percent in commercial-business, 2 percent in vocational, 4 percent in the agriculture and 5 percent in the other curricula. John C. Flanagan, Project TALENT: Selected Findings and Data, American Institutes for Research and University of Pittsburgh, Pennsylvania, 1970, Figure 9.

Actual Data and Assessment of Achievement

If one uses dropout rates as a reflection of the ability of a curriculum to serve enrollees with lesser abilities, the Project TALENT data presented above (see Objective 6) provide little encouragement to vocational education advocates, except those of the commercial programs. Agriculture had by far the highest dropout rates among the lowest aptitude group (40 percent dropped out). Among students in the next quartile, agriculture fared notably better, being second only to the college preparatory program and having cut its rate (by a factor of 4) to 10 percent. Retention in all programs improved markedly for this quartile, however, and the principal conclusion that one may draw is that none of the curricula appears to serve well the most academically disadvantaged students.

Project TALENT information on "mechanical reasoning" exists and should be analyzed to see if those with aptitude in this area, who may have less aptitude in the academic area, are being served well by vocational programs. It may be that this group is well-served by vocational education while those who possess neither academic nor mechanical aptitude account for the great majority of dropouts.

VII. MEASURING ACHIEVEMENT OF OBJECTIVES IN AN ECONOMIC SENSE: THE COST-EFFECTIVENESS OF VOCATIONAL EDUCATION WHEN COMPARED WITH MANPOWER PROGRAMS

INTRODUCTION

The purpose of this section of the report is to provide a cost-effectiveness analysis of secondary and post-secondary vocational-technical education as well as an analysis of 2-year junior college education. Where similarities among the populations served warrant it, the above three types of education will be compared in economic investment terms with selected Federal government manpower programs such as the MDTA, JOBS, Job Corps or the Neighborhood Youth Corps out-of-school component (NYC-OS). The objectives of the various manpower programs, as well as the population each is intended to serve, are displayed in Table 35.

When treating these various programs as substitutes for each other, one should note that the superficial similarities among the populations they serve obscure some very significant dissimilarities. For instance, those served by the MDTA and those served by vocational education will differ in terms of age, family life cycle, the opportunity costs (foregone wages) they bear while being trained, quality and quantity of prior education, and other significant characteristics. Thus, neither of these programs can be thought of as a perfect substitute for the other. For another contrast NYC-OS is being refocused on 16- and 17-year-old high school dropouts. This group is clearly different from the persons generally served by the institutional MDTA. The MDTA enrollees may or may not be high school dropouts, and 35 percent of them are 19 years old or older.

Thus, one should be conservative when suggesting substitutions among the programs analyzed in this section. In addition, one should be aware that

TABLE 35.—Objectives and population to be served for selected manpower programs

Program and date started	Objectives[1] and services	Population served[2]
Concentrated Employment Program (CEP) May, 1967	Coordinated program of manpower and supportive services	Hard-core, unemployed, youths and adults in selected areas where they are concentrated
Job Corps January, 1965	Residential program of intensive education, skill training and related services	Low income, disadvantaged youth 16 to 21 years of age
Job Opportunities in the Business Sector (JOBS) March, 1968	Uses private industry to hire, train, retain and upgrade the program population	Hard-core unemployed 18 years of age and over
MDTA Institutional and On-the-Job Training, August, 1962	Provides occupational training or retraining in a classroom setting or instruction combined with supervised work at the job site under contracts with private and public employers	Unemployed and underemployed persons 16 years of age and over, two-thirds of whom must be disadvantaged
Neighborhood Youth Corps (NYC) Out-of-School, January 1965	Job preparation through paid work experience	Disadvantaged youth of high school age (14 to 21). New design of out-of-school NYC limits population to 16- and 17-year-old dropouts
Vocational Education, 1917	Full- or part-time vocational training, primarily in a classroom setting to reduce the flow of unskilled or ill-prepared youth into the labor market	Youth or adults, in or out of public schools. New emphasis on poor and disadvantaged

NOTES TO TABLE 35

1/ "For all of these programs, the major objective is to upgrade or provide occupational skills that will be of value in the labor market. Each program cites additional objectives, some of which are economic in nature and some of which are psychological or social in nature; but the major goal of each of these programs is to enhance the earnings and employment of the group served.

2/ "Disadvantaged" means poor, not having suitable employment and either (a) a school dropout, (b) a member of a minority, (c) under 22 years of age, (d) 45 years of age or over, or (e) handicapped.

Source: U.S. Department of Labor, Manpower Report of the President, March 1970, Appendix A: "Guide to Federally Assisted Manpower Training and Support Programs."

the cost-benefit studies summarized here report only monetary economic costs and benefits. They do not account for nonmonetary economic costs or benefits, nor do they explicitly deal with noneconomic factors such as psychic costs or benefits. However, the monetary measures are considered to subsume the major portion of all costs and benefits.

It is also important to note that each of these studies uses different methodologies; for instance, each controls for different sociodemographic variables and some studies use different control groups. Several studies use no control group at all but rely on before-after comparisons. While different concepts of cost or benefit can be adjusted for, the basic methodologies underlying the studies cannot be changed. Hence, this report is a summary statement of what has been done but, to some extent, the studies are not comparable, even when populations served are the same.

The remainder of the section is organized as follows. Secondary vocational-technical education will be compared in investment terms with selected secondary education alternatives, such as graduation from a comprehensive high school. Then, post-secondary vocational technical education and 2-year junior college will be analyzed. Finally, the manpower programs will be analyzed in the same terms, starting with MDTA, then Job Corps, NYC-OS, JOBS, and the Concentrated Employment Program (CEP).

SUMMARY OF RESULTS

Secondary Vocational-Technical Education

Among the secondary curricula, it is most reasonable to evaluate the secondary vocational-technical curriculum in economic terms. However, there is a problem in choosing the appropriate control or comparison group against which to judge the net economic performance of this curriculum. Table 36 displays the cost-benefit analysis of vocational-technical education with respect to two different control groups. The first control group is the combined curricula of the comprehensive high school. This control group would include the academic or college preparatory curriculum as well as the general and vocational-comprehensive curriculum. The latter is essentially a general curriculum wedded with a group of vocational courses, none of which is intensive enough to give the student highly marketable skills. The other comparison is against the academic or college preparatory curriculum alone. Using either of these broad control groups creates problems of comparison, since the objectives of the various curricula are somewhat different. Additionally, the sociodemographic characteristics and personal objectives and goals of the groups partaking of the various curricula are different. For instance, the vocational-technical graduate, as compared to the academic graduate, may put a heavier weight on earnings than on the nonmonetary gratification to be had from a job. Thus, when the two types of graduates are compared, the benefits to the vocational-technical graduate may be overstated since having immediate money income may be less important to the academic graduate than to the vocational-technical graduate. The fact that

TABLE 36.—Comparative analysis of cost and benefit estimations of selected studies of secondary vocational-technical education

Name of Study[5]	Time Period of Study[1]	Locus of Study	Experimental Group	Control Group	Cost/Year[6]		Benefit/Year[7]		Duration of Training in Years	Duration of Benefits in Years[4]	Rate of Return (percent)	Present Value in Dollars	
					Marginal	Average[9]	Marginal	Average[9]				5%	10%
1. Hu, Lee, and Stromsdorfer	1959-66	Baltimore, Phila., Detroit	Vocational-Technical[8]	Comprehensive[8]									
a.[2] 1.		Phila.,			464		343		3	6	9.3	240	Neg
2.		Detroit			386		643		3	6	33.6	1776	1152
b.[2] 1.		Phila.			485		343		3	6	8.2	183	Neg
2.		Detroit			403		643		3	6	31.8	1772	1102
2. Fernbach and Somers	1964-69	Nation-wide	Vocational-Technical	Secondary Academic									
a.						592;596; 615[3]		667	3	10	25.9	2811	1583
b.						711;715;738		667	3	10	21.4	2484	1283
3. Project Talent (Males only)	1958-65	Nation-wide	Vocational-Technical	College Prep.									
a.						465;483; 485[3]		375	3	10	17.7	1200	542
b.						560;574;585		375	3	10	13.8	943	307
4. Corazzini (Males only)	1963-64	Wrcstr, Mass.	Vocational-Technical	Comprehensive									
a. 1.					512		312		2	10	23.1	1059	596
2.						964		312	2	10	7.4	219	Neg
b. 1.					618		312		2	10	17.9	862	412
2.						1129		312	2	10	4.1	Neg	Neg
5. Eninger (Males only) 1956-64:	1950-64	Nation-wide	Vocational-Technical	Academic									
a.						435;447; 465[3]	412	412	3	10	21.2	1624	783
b.						522;547;522	412	412	3	10	18.3	1358	631
1960-64 a.						485;491; 496[3]		577	3	10	27.4	2512	1443
b.						582;589;595		577	3	10	22.8	2245	1199

NOTES TO TABLE 36

1/ Time period of study includes the training period as well as the available time for follow-up at the time the data were gathered.

2/ (a) signifies current operating costs; (b) signifies total resource costs to society including current operating costs, capital costs and opportunity costs where applicable. This is the case for all the following similar tables.

3/ Each cost figure applies to a different year in the relevant 3-year training period.

4/ The 6-year benefit for Hu et al. is based on the estimated length of time benefits persisted in the three-city study. The 10-year benefit period is based on Eninger, op. cit.

5/ The study by Michael K. Taussig, "An Economic Analysis of Vocational Education in New York City," Journal of Human Resources, Supplement: Vocational Education, Vol. III, 1968 is not reported here. The fact that he reports zero benefits makes the presentation of other detail superfluous. Thus, in the Taussig study a zero rate of return, and negative present earnings values exist. It should be noted, however, that one cannot generalize these findings to the more conclusive nationwide analyses presented below.

6/ Costs per year are relatively low since opportunity costs, that is, foregone wages, are assumed to be the same between secondary vocational students and comprehensive students. Also, to the extent that they exist, these opportunity costs to society are assumed to be quite low since the influx of all high school students into the labor market at once would depress considerably an already low level of earnings for this age group.

7/ All benefits are before-tax earnings and represent a social benefit—that is, an increase in value-added to the gross national product.

8/ Neither of these two groups had any post-secondary or junior college or college education in the 6-year follow-up period.

9/ The costs are true average costs. The benefits are differences between averages of the two comparison groups. Thus, the estimated rates shown here understate the actual average rate of return.

TABLE 36 (Sources)

1. Teh-wei Hu, Maw Lin Lee and Ernst N. Stromsdorfer, (Jacob J. Kaufman, project director), A Cost Effectiveness Study of Vocational Education: A Comparison of Vocational and Nonvocational Education in Secondary Schools, Institute for Research on Human Resources, The Pennsylvania State University, University Park, Pennsylvania, March 1969.

2. Benefit Data are from: Susan Fernbach and Jerald G. Somers, An Analysis of the Economic Benefits of Vocational Education at the Secondary, Post Secondary, and Junior College Levels, Preliminary Report, Center for Studies in Vocational and Technical Education, University of Wisconsin, Madison, Wisconsin, May 1970. Cost data are from: American Institutes for Research, An Analysis of Cost and Performance Factors for the Operation and Administration of Vocational Schools for Secondary Programs, Pittsburgh, Pennsylvania, May 1967.

3. Benefit data are from: Unpublished Project TALENT data, 5-year follow-up information on high school graduates of 1960 cited in Howard Vincent, "An Analysis of Vocational Education in Our Secondary Schools," U.S. Office of Education, Office of Program Planning and Evaluation, July 1969 (revised), mimeo. Cost data are from: American Institutes for Research, op.cit., May 1967.

4. Arthur J. Corazzini, "The Decision to Invest in Vocational Education: An Analysis of Benefits," in The Journal of Human Resources, Supplement: Vocational Education, Vol. III, 1968.

5. Benefit data are from: Max U. Eninger, The Process and Product of T and I High School Level Vocational Education in the United States, The Product, American Institutes for Research, Pittsburgh, Pennsylvania, September 1965. Cost data are from: American Institutes for Research, op.cit., May 1967.

there is a higher dropout rate from vocational than from academic programs may be an expression of the fact that students who choose vocational courses may make judgments over a shorter time horizon and weight immediate financial reward more heavily than do academic curriculum students. This issue will be investigated at greater length in subsequent discussion.

The data in Table 36 display both internal rates of return—the profit rate of the program—and net present capital values—the present value of benefits minus the present value of costs. Three of the five studies listed are nationwide in scope, while two related to specific locales. A sixth study of New York City is not reported.[1/] Major reliance for policy decisions should be placed on the three studies which are nationwide in the scope of their sample.

Average Costs and Benefits. The Somers and Fernbach study[2/] indicates that vocational-technical graduates earn an average of $667 more per year than do secondary academic graduates. Total social costs, including direct operating costs, capital costs, and foregone earnings, amount to an average of about $720 per year. Thus, the average rate of return to vocational-technical education for the Somers-Fernbach sample of vocational-technical graduates is approximately 21.4 percent for the investment over a projected 10-year period. If the social cost rate of capital is 10 percent, then vocational technical education yields a relatively high rate of return.[3/] Thus, relative to the academic curriculum, vocational-technical education covers its costs with a substantial margin to spare. The Project TALENT data, based on a subsample of males, and the Eninger data, based on a male nationwide sample, bear out this general result. The Project TALENT data indicate a 13.8 percent return on total social costs, while the Eninger data indicate an 18.3 percent and a 22.8 percent average return to vocational-technical education for two different cohorts of males. Finally, these estimated rates understate the actual average rate of return to vocational education since, although the costs are true average costs, the benefits shown represent the differences between the two averages for the groups compared in studies 2, 3, and 5 of Table 36.

[1/] See Michael K. Taussig, "An Economic Analysis of Vocational Education in New York City," Journal of Human Resources, Supplement: Vocational Education, Vol. III, 1968. Benefits in the study are reported as zero. Given the study data and their qualifications, vocational education in New York City was not an economically efficient investment in education for the year of the study data.

[2/] Gerald G. Somers and Susan B. Fernbach, An Analysis of the Economic Benefits of Vocational and Technical Education at the Secondary, Post-Secondary, and Junior College Levels: A Preliminary Report on an Evaluation of Vocational and Technical Education in the U.S., University of Wisconsin, Center for Studies in Vocational and Technical Education, Madison, 1970.

[3/] Ten percent is the usual upper limit placed on the social opportunity cost rate of capital. Under current conditions of high interest rates, one might argue for a hig[illegible]pper limit. However, to the extent that this higher rate of interest is due to [illegible]lation, it should be deflated. The social rate of interest or the social opportunity cost rate is usually defined as the riskless, deflated interest cost rate.

Marginal Costs and Benefits. These studies indicate that the average costs of vocational-technical education are more than covered by the average benefits of the program. Thus, in absolute terms, the program is operating in the black. However, a second question involves the economic returns to vocational-technical education relative to alternative uses of social capital. For example, should additional funds be spent on vocational-technical education relative to competing secondary curricula? The answer to this question requires an estimation of the additional or extra benefits yielded by vocational-technical education for each additional dollar spent. In economic parlance, marginal (or extra) benefits must be compared to marginal (or extra) costs.

The distinction between average and marginal is as follows. Average costs (or benefits) equal total costs (or benefits) divided by total persons in the program. Marginal costs (or benefits) are the additional costs (or benefits) due to adding an extra person to the program. Marginal costs in this analysis are usually estimated in a statistical cost function by relating total costs to total enrollments in a program to see how total costs change as total enrollment changes by one unit. However, in some cases marginal cost is taken as the difference between two average costs — that of the experimental group and that of the control. Marginal benefits in this analysis are estimated by comparing the difference in average performance of the experimental group and the control group. Strictly speaking, all the marginal benefits in this survey analysis are differences between two averages. But, if one accepts the assumption that shifting a person from one group to the other increases the average benefit by the amount of the differences in the two averages, then this difference can be assumed to be a marginal difference.

The study of specific cities by Hu, Lee, and Stromsdorfer, and that by Corazzini, indicate that the marginal rate of return to vocational-technical education is also high. The marginal rate of return to vocational-technical education (compared to the curricula of the comprehensive high school) is 31.8 percent in Detroit, 8.2 percent in Philadelphia, and 17.9 percent in Worcester, Massachusetts. Thus, for the short run, that is, the next legislative period, relatively more of the extra social funds available for investment in secondary education should be spent on vocational-technical education, especially for those who do not plan a college career.

One qualification should be noted as this point. The analysis suggests that secondary vocational-technical graduates as a group do better (earn more) than academic or comprehensive high school graduates. But not all occupational specialties in vocational-technical education pay off equally well. The cost-benefit analysis, thus far, only answers the question of which broad curriculum area society should invest its additional social capital in; it does not indicate which occupational skill or specialty one should choose within that broad curriculum, given the qualifications to the analyses mentioned on pages 123ff and elsewhere.

Secondary Education and Dropout Behavior

There has been much criticism of vocational education because its dropout rate has been higher than that of the academic curriculum. Table 37 gives the relative dropout rates for Project TALENT males. This criticism of vocational-technical education is warranted, but is more complex than a simple condemnation of the program, as the discussion following the table suggests.

The student who takes the vocational-technical curriculum is somewhat different from the academic student in terms of sociodemographic background as well as reasons for choosing a specific kind of education. He may have a shorter time horizon—that is, he may value present economic gain more highly than future economic gain. This is an understandable behavior pattern for the disadvantaged person who is enrolled in vocational courses. Likewise, the vocational student may value the money income of a job more highly and the status of a job less highly than would an academic graduate. Also, he is training for a job in which he is to be employed immediately upon leaving high school. When labor markets are tight he does not necessarily need to be a high school graduate to get this job as long as he has the skills necessary to meet the occupational minimum. (There is a direct relation between the unemployment rate and the high school retention rate which backs up this hypothesis). Thus he may, in effect, be able to fulfill the purpose of the program—placement in a job—by dropping out of school. In contrast, the academic graduate must have a high school diploma in order to proceed to the next step in his occupational career—college attendance. Also, the ultimate job the college-bound student strives for is different from that for which the vocational graduate strives. One may be able to get such a job if he is a college dropout, but not if he is a high school dropout. In short, the combination of different sociodemographic backgrounds, different weights on income versus status, different time horizons, and different constraints on job entry (e.g., high school diploma necessary/not necessary) make it inevitable that there will be a higher gross dropout rate for vocational-technical education. The phenomenon is, in fact, built into the program.

What the data in Table 38 suggest, therefore, is that the calendar time spent in a vocational-technical program may be too long. This possible excessive time is actually the result of a curriculum mix that is forced upon the students but which may not correspond to labor market realities or the needs and long-term plans of students. The MDTA program purports to give a man entry level skills after no more than 52 weeks or 1 calendar year of training. What point is there in dragging out the education for this equivalent goal to 2 calendar years in high school? The dropout rate from vocational-technical education might be reduced if the calendar time spent in high school were cut, by 1 year, from 4 to 3 years. As Table 38 shows, an additional calendar year of high school is a detriment to preparation in a number of occupations, such as electrician and machinist. One should note, also, that most of the occupations listed represent skill specialties offered in vocational-technical schools.

TABLE 37.—Dropout rates of high school students by program and ability quartile 1/

(Per 100 students)

High school program	Total	Ability quartile			
		Low	II	III	High
General	16.2	25.6	16.7	9.1	5.7
College prep . .	3.9	22.5	6.8	1.9	1.4
Commercial . .	12.5	18.3	10.9	9.3	5.7
Vocational . . .	22.4	29.8	18.7	8.7	2/
Agriculture . . .	27.3	39.3	9.9	2/	2/

1/ Dropout rates are based on information collected on 10th graders in 1960 and follow-up analysis in 1963; both males and females are included.

2/ The size of the population within this cell did not warrant the calculation of dropout rates.

Source: Unpublished data from Project TALENT.

TABLE 38.— Present value of earning streams for males age 17, by occupation, years of school completed, and ethnic category, for the United States, 1960

(Interest rate = 10 percent)

		White	Nonwhite
1.	Experienced Civilian Labor Force		
	HS 4	$38,384	26,329
	HS 1-3	35,960	23,645
		2,424	2,684
2.	Experienced Civilian Labor Force		
	HS 4	39,018[B]	------
	HS 1-3	36,601[B]	------
3.	Professional, Technical and Kindred		
	HS 4	44,428	33,037[C]
	HS 1-3	42,448	------
		1,980	
4.	Designers and Draftsmen		
	HS 4	46,980	-------
	HS 1-3	46,411	-------
		569	
5.	Farmers and Farm Managers		
	HS 4	22,762	------
	HS 1-3	21,507	------
		1,255	
6.	Managers, Officials and Proprietors		
	HS 4	45,941	------
	HS 1-3	45,869	------
		72	
7.	Buyers and Department Store Heads		
	HS 4	46,049	------
	HS 1-3	46,891	------
		-842	
8.	Clerical and Kindred		
	HS 4	37,066	31,713
	HS 1-3	35,770	30,952
		1,296	761
9.	Bookkeepers		
	HS 4	35,902	------
	HS 1-3	35,065	------
		837	

TABLE 38 (Cont)

	White	Nonwhite
10. Shipping and Receiving Clerks		
HS 4	34,730	31,988[B]
HS 1-3	35,689	36,213
	-959	-4,225
11. All Other Clerical		
HS 4	36,525	28,767[C]
HS 1-3	34,699	28,012
	1,826	755
12. Sales Workers		
HS 4	38,067	28,281[B]
HS 1-3	32,178	23,464[B]
	5,889	4,817
13. Insurance, Brokers and Underwriters		
HS 4	44,430	------
HS 1-3	45,464	------
	-1,034	
14. Craftsmen, Foremen and Kindred		
HS 4	42,548	30,956
HS 1-3	42,155	28,727
	393	2,229
15. Brickmasons, Stonemasons and Tile		
HS 4	45,081	------
HS 1-3	42,539	------
	2,542	
16. Carpenters		
HS 4	38,449	------
HS 1-3	38,624	------
	-175	
17. Compositors and Typesetters		
HS 4	42,859	------
HS 1-3	44,979	------
	-2,120	
18. Electricians		
HS 4	46,103	------
HS 1-3	48,358	------
	-2,255	

TABLE 38 (Cont)

	White	Nonwhite
19. Lineman and Service		
HS 4	46,889	------
HS 1-3	48,992	
	-2,033	
20. Machinists		
HS 4	43,707	------
HS 1-3	44,187	------
	-480	
21. Mechanics and Repairmen		
HS 4	38,816	------
HS 1-3	38,769	------
	47	
22. Airplane Mechanics and Repair		
HS 4	45,049[C]	------
HS 1-3	45,149	------
	-100	
23. Auto Mechanics and Repair		
HS 4	35,962	------
HS 1-3	36,428	------
	-466	
24. Painters, Construction and Maintenance		
HS 4	35,511	------
HS 1-3	32,925	------
	2,586	
25. Plumbers and Pipefitters		
HS 4	46,446	------
HS 1-3	45,427	------
	1,109	
26. Toolmakers and Diemakers, Setters		
HS 4	52,847	------
HS 1-3	53,211	------
	-364	
27. Operatives and Kindred		
HS 4	37,576	27,167
HS 1-3	36,821	26,519
	765	648

TABLE 38 (Cont)

	White	Nonwhite
28. Truck and Tractors Drivers		
HS 4	37,502	------
HS 1-3	38,997	------
	-1,495	
29. Other Specified Operatives		
HS 4	37,089	25,907[C]
HS 1-3	35,256	25,729
	1,833	178
30. Service Workers		
HS 4	30,860	21,249
HS 1-3	27,431	20,170
	3,429	1,079
31. Barbers		
HS 4	33,622	------
HS 1-3	35,645	------
	-2,023	
32. Protective Service Workers		
HS 4	41,895	------
HS 1-3	40,453	------
	1,442	
33. Other Service Including Households		
HS 4	24,659	20,330
HS 1-3	22,720	19,754
	1,939	576
34. Farm Laborers & Foremen		
HS 4	18,693	11,602[B]
HS 1-3	16,540	9,784[B]
	2,153	1,818

NOTES TO TABLE 38

[A] The data presented were calculated as follows:

$$\text{Return to HS 4 at age 17} = \frac{Y^4_{17}}{(1+r)^1} + \frac{Y^4_{18}}{(1+r)^2} + \ldots \frac{Y^4_{64}}{(1+r)^{48}}$$

$$\frac{Y^{1-3}_{17}}{(1+r)^1} + \frac{Y^{1-3}_{18}}{(1+r)^2} + \frac{Y^{1-3}_{64}}{(1+r)^{48}}$$

where

Y^4 and Y^{1-3} = median earnings of those with 4 years of high school and 1-3 years, respectively, subscripts refer to age,

and

$Y^4_{17} = 0$ by assumption.

Also

$$Y_{18} = Y_{19} = \ldots = Y_{24}$$

$$Y_{25} = Y_{26} = \ldots = Y_{34}$$

$$\vdots$$

$$Y_{55} = Y_{56} = \ldots = Y_{64}$$ for Y^4 and Y^{1-3}, again, by assumption,

and

r = 5 percent and 10 percent.

[B] Age 18-24 and 25-64 cohorts used.

[C] Age 55-64 cohort earnings estimated.

Source: Stuart O. Schweitzer, "Occupational Choice, High School Graduation, and Investment in Human Capital," Hearings of the Joint Economic Committee, Subcommittee on Economy in Government, National Priorities, 1-18 June 1970.

Post-Secondary Vocational-Technical Education and Junior College

The second major context for decisions regarding the training of the U.S. labor force lies in the area of post-secondary vocational-technical education. The study upon which the bulk of this analysis is based was done at the University of Wisconsin. The analysis pertains to a nationwide sample of secondary academic and vocational-technical graduates and post-secondary vocational-technical and junior college graduates. As can be seen in Table 39, the marginal rate of return for post-secondary vocational-technical education is 6.8 percent with respect to secondary academic education (see Somers and Fernbach, study 1 in Table 39. While the 6.8 percent rate is less than the assumed 10 percent social cost rate of capital, it is still higher than the usual lower bound of the social capital cost estimate, which is 5 percent. Based on these results, it is economically efficient for society to invest in post-secondary vocational-technical education for a person who is an academic curriculum high school graduate. This judgment is borne out by the Carroll and Ihnen study (study 4) which shows a marginal rate of return of 16.5 percent for post-secondary vocational education relative to academic high school graduation in North Carolina. However, Somers and Fernbach (study 2) also show that a person who is a graduate of a secondary vocational-technical curriculum suffers a net economic loss if he undertakes 2 additional years of post-secondary vocational-technical education. On economic efficiency grounds, therefore, society should discourage this educational sequence, unless or until additional empirical evidence shows a more favorable rate of return. Of course, this judgment can be tempered by non-efficiency considerations. Namely, it may not be politically possible or socially desirable to prohibit this educational sequence.

Somers and Fernbach also provide evidence on the economic returns to junior college training. The marginal rate of return to junior college relative to post-secondary vocational-technical education is 14.2 percent (study 3). Thus, it is economically more rational for society to invest in 2 years of junior college than for it to invest in 2 years of post-secondary vocational-technical education. Finally, unlike post-secondary vocational-technical education, 2 years of junior college relative to secondary vocational training yield a marginal rate of return of 17.6 percent (study 5). To summarize, in view of its relatively lower cost and higher return, junior college is a more economically efficient source of post-secondary education than the post-secondary vocational-technical institution.

Of course there remains the problem, noted at the outset, that the populations served by the two types of school may differ. To the extent that this is so, cost-benefit comparisons between the two types of post-secondary education are not strictly valid. One may object that the disaggregation of each type of post-secondary education into its skill or course components will reveal that each has some skills that pay off well in economic terms and others that are of low economic value. The point to be made here, however, is that the average mix of skills and courses taught in the junior college yields a higher rate of return than the average mix of skills and courses taught in post-secondary vocational-technical institutions.

TABLE 39.—Comparative analysis of cost and benefit estimates of selected studies of post-secondary vocational-technical education and junior college education

Name of Study	Time Period of Study[1]	Locus of Study	Experimental Group	Control Group	Cost/Year		Benefit/Year[6]		Duration of Training in Years	Duration of Benefits in Years[4]	Rate of Return (percent)	Present Value in Dollars	
					Marginal	Average	Marginal	Average				5%	10%
1. Fernbach and Somers	1964-69	Nation-wide	Post-sec. vocational education	Secondary[5] Academic									
a.[2]					2494;2519[7]		996		2	10	8.7	1198	**Neg**
b.					3084;3132		996		2	10	6.8	642	**Neg**
2. Fernbach and Somers	1964-69	Nation-wide	Post-sec. vocational education	Secondary vocational education									
a.					2814;2839[7]		238		2	10	Neg	Neg	Neg
b.					3504;3552		238		2	10	Neg	Neg	Neg
3. Fernbach and Somers	1964-69	Nation-wide	Junior College	Post-sec. vocational education									
a.					2598;2616[7]		1704		2	10	26.1	7087	4129
b.					3110;3144		1704		2	10	14.2	4262	1492
4. Carroll and Ihnen	1959-64	North Carolina	Post-sec. vocational education	Secondary Academic	3551;3874[8]		555[3]		2	43	16.5	15523	5157
5. Fernbach and Somers	1964-69	Nation-wide	Junior College	Secondary vocational education									
b.					3474;3474[7]		1656		2	10	17.6	5400	2617

NOTES TO TABLE 39

1/ Time period of study includes the training period as well as the available time for follow-up at the time the data were gathered.

2/ (a) includes current operating costs and opportunity costs; (b) includes current operating costs, capital costs and opportunity costs.

3/ Benefits are estimated to increase at a rate of $161 per year and reach $1,038 in the fourth year after graduation. In general, a 2 percent growth rate was applied to the earnings differential between the post-secondary technical graduates and their control group, comprehensive high school graduates.

4/ Except in the case of the Carroll and Ihnen study, benefit duration is based on the estimate of Max U. Eninger, The Process and Product of T and I High School Level Vocational Education in the United States: The Product, American Institutes for Research, Pittsburgh, Pennsylvania, September 1965.

5/ Opportunity costs are based on the earnings experience of secondary vocational rather than secondary academic. This results in an upward bias in the cost estimate and a corresponding reduction in net benefits.

6/ All benefits are before-tax earnings and represent a social benefit, that is an increase in value-added in the gross national product.

7/ Costs are expressed for each of the 2 successive years of training.

8/ Costs are total social costs, which include current operating costs, capital costs and opportunity costs.

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TABLE 39 (Sources)

1. Benefit data are from: Gerald G. Somers and Susan Fernbach, An Analysis of the Economic Benefits of Vocational Education at the Secondary, Post-Secondary and Junior College Levels, Preliminary Report, Center for Studies in Vocational and Technical Education, University of Wisconsin, Madison, Wisconsin, May 1970. Cost data are from: Somers and Fernbach, op. cit., May 1970 and William C. Morsch, Study of Community Colleges and Vocational Training Centers: Cost Analysis, The Bureau of Social Science Research, Inc., Washington, D.C., 1970.

2. Benefit data are from: Somers and Fernbach, op. cit., May 1970. Cost data are from: Somers and Fernbach, op. cit., May 1970 and Morsch, op. cit., 1970.

3. Benefit data are from: Somers and Fernbach, op. cit., May 1970. Cost data are from: Somers and Fernbach, op. cit., May 1970 and Morsch, op. cit., 1970.

4. Adger B. Carroll and Loren A. Ihnen, "Costs and Returns for Two Years of Post Secondary Technical Schooling: A Pilot Study," Journal of Political Economy, Vol. 75, No. 6, December 1967.

5. Unpublished data from Somers and Fernbach, op. cit., May 1970.

Institutional and On-the-Job Manpower Training

It is often asserted that vocational education should be training the labor force for jobs in the future—the "jobs of tomorrow." However, a moment's reflection on the hazards of economic planning and projection in general, given a technologically dynamic economy, should bring one to the realization that this is a counsel of perfection. Most people change occupations several times during their lives, and those who do not normally do so, such as professional persons, find the requirements of their jobs constantly evolving. Even if vocational education were training appropriately for the "jobs of today," the short run in which most of us live, it would not be unreasonable to expect the necessity of a national manpower retraining effort to upgrade the labor force as the technological requirements for human capital change. Thus, manpower training is complementary to and not necessarily competitive with vocational training. However, as indicated above, vocational education could learn some lessons from manpower training, which concentrates the educational effort in a relatively short calendar period.

Six different studies of manpower training exist that present a cost-benefit analysis. The Main study (study 1 shown in Table 40) is judged to give the most accurate assessment of the net returns to institutional manpower training, since the greatest pains were taken to provide an appropriate control group for a nationwide sample and adjustments were made for major socio-demographic, motivational, and economic variables. If the benefits to such training are assumed to last only 10 years, then the marginal rate of return is 15.9 percent. If the benefits are assumed to last the remaining working life of the trainee, 35 years, then the marginal rate of return is 20.2 percent. The other nationwide study, by Muir et al. (study 3 in Table 40), shows much higher marginal rates of return for institutional MDTA training, but there is an upward bias in these estimates due to the use of a "before-after" labor market comparison for the trainee rather than a control group comparison. In short, manpower training is a necessary complement to vocational training in a technologically evolving economy. The fact that different populations may be served by the two programs also reinforces their complementarity. The marginal rates of return to manpower training at least equal and are probably higher than those to secondary vocational education. Additional social funds (over and above the current level) are warranted for this highly successful program.

Finally, within the MDTA program, the marginal rates of return to the institutional and the on-the-job components of the program are similar, based on benefits estimated by the Muir et al. study. Thus, given present data, there is no economic efficiency basis for expanding one of these program components at the expense of the other.

JOBS and CEP

The JOBS and CEP training programs are close substitutes for MDTA training. The JOBS program is similar to the MDTA on-the-job training program

TABLE 40.—Comparative analysis of cost and benefit estimates of selected studies of MDTA institutional and on-the-job retraining and ARA retraining

Name of Study	Time Period of Study 1/	Locus of Study	Experimental Group	Control Group	Cost/Year 2/		Benefit/Year 3/		Duration of Training in Years 4/	Duration of Benefits in Years 5/	Rate of Return (percent)	Present Value in Dollars	
					Marginal	Average	Marginal	Average				5%	10%
1. Main	1965-66	Nation-wide	MDTA grads & dropouts	*	1983 1983		409 409		1 1	10 35	15.9 20.2	1110 4490	482 1783
2. Hardin and Borus	1962-65	Mich.	MDTA enrollees	MDTA applicants	1272 1272		251 251		1 1	10 35	14.7 19.7	634 2703	246 1044
3. Muir, et al. a. Instnl.	1963-65	Nation-wide Judgmt. Sample	MDTA grads	grads Before-after comparison	2444 2444		1338 1338		1 1	10 33	54.0 54.7	7512 18064	5252 9418
b. On-the-Job	1963-65	Nation-wide Judgmt. Sample	MDTA grads	Before-after comparison	2132 2132		1208 1208		1 1	10 32	56.0 56.7	6853 16150	4800 8524
4. Stromsdorfer	1959-63	W. Va.	ARA grads	**	632 632		874 874		1 1	10 33	138.0 138.3	5826 13172	4308 7114
5. Borus	1962-63	Conn.	MDTA grads	***	1413 1413		459 459		1 1	10 39	**30.2** **32.5**	**2029** **6093**	**1279** **2786**
6. Page	1958-61	Mass.	MDTA grads	**	1693 1693		874 874		1 1	10 35	50.8 51.6	4815 12017	3343 6124

*Relatives and neighbors unemployed during training period.

**Workers unemployed during program.

***Unemployed workers who refused retraining.

NOTES TO TABLE 40

1/ Time period of study includes both the training period and the period available for measuring benefits at the time of data collection.

2/ All costs are total social costs and thus include current operating costs, capital costs and opportunity costs.

3/ All benefits are before-tax earnings and represent a social benefit—that is, an increase in value-added in the gross national product.

4/ Most MDTA and ARA training lasted less than 1 year. The 1-year duration assumption, therefore, understates the present value of costs and the rate of return a small amount in the discount process; however, it was used for purposes of simplification.

5/ The 10-year period of benefits is an arbitrary period chosen for comparison with the estimated duration of benefits accruing to secondary vocational-technical education. The longer periods are the net estimated working life of the trainees after the end of training.

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TABLE 40 (Sources)

1. Benefits are taken from: Earl D. Main, "A Nationwide Evaluation of MDTA Institutional Job Training," Journal of Human Resources, Vol. III, No. 2, Spring 1968. Costs are taken from: Ralph E. Smith, "Foregone Earnings During Manpower Training," Working Paper 350-11, The Urban Institute, 28 January 1970, to be published in Hearings, Joint Economic Committee, Subcommittee on Economy in Government, National Priorities, 1-18 June 1970, and Garth Mangum, MDTA: Foundation of Federal Manpower Policy, The Johns Hopkins Press, 1968.

2. Einar Hardin and Michael E. Borus, Economic Benefits and Costs of Retraining Courses in Michigan, School of Labor and Industrial Relations, Michigan State University, East Lansing, Michigan, December 1969.

3. Benefits are taken from: Allan H. Muir, et al., Cost/Effectiveness Analysis of On-the-Job and Institutional Courses, Planning Research Corporation, PRC D-1297, Washington, D.C., June 1967. Costs are taken from: Ralph E. Smith, op. cit., 28 January 1970.

4. Ernst W. Stromsdorfer, "Determinants of Economic Success in Retraining the Unemployed," Journal of Human Resources, Vol. III, No. 2, Spring 1968.

5. Benefits are taken from: Michael E. Borus, "A Benefit-Cost Analysis of the Economic Effectiveness of Retraining the Unemployed," Yale Economic Essays, Vol. 4, No. 2, Fall 1964. Costs are taken from: Ralph E. Smith, op. cit., 28 January 1970.

6. Benefits are taken from: David A. Page, "Retraining Under the Manpower Development Act: A Cost-Benefit Analysis," in John D. Montgomery and Arthur Smithies, Public Policy, Vol. 13, Harvard University Press, 1964. Costs are taken from: Ralph E. Smith, op. cit., 28 January 1970.

except insofar as the initiative of the JOBS program may be more with private employers. The CEP contains elements of the institutional and on-the-job MDTA training. The study results appear in Table 41.

Unfortunately, before-after comparisons of enrollee experience must be relied upon for evaluating JOBS and CEP, rather than the use of more suitable control groups. The best analysis of the costs and benefits of the JOBS program is that by the Department of Labor (study 2 in Table 41). This analysis is based on a national random sample taken from Social Security records. A before-after comparison is used to measure benefits. If a 10-year benefit period is assumed, the marginal rate of return is 28.9 percent, while the rate is 31.3 percent when benefits are assumed to last the remainder of an enrollee's working life. The MDTA study that is most similar to the JOBS analysis is the nationwide evaluation by Muir et al., which also uses a before-after comparison. Comparable rates of return to on-the-job MDTA training are 56.0 percent for a 10-year benefit period and 56.7 percent for remaining working life after training. Thus, under current arrangements, MDTA on-the-job training is yielding a marginal rate of return which is almost twice that of the JOBS program. Other things being equal, then, additional social capital should be devoted to MDTA on-the-job training rather than to the JOBS program. Other things may not be equal, however, since it may be desirable to maintain or expand the present level of the JOBS program to continue private involvement and initiative in manpower training.

The only study of the CEP which allows a benefit-cost comparison relates to data gathered from seven central cities. The marginal rates of return based on a "before-after" comparison are quite high and fall in the mid-range of rates estimated for institutional MDTA training. Thus, there is little basis at this time for making a distinction between the two types of programs on efficiency grounds. A nationwide evaluation of the CEP based on an appropriate random sample with an appropriate control group is needed.

Finally, there is no economic evaluation of the Work Incentive (WIN) program.

The Job Corps and NYC-OS

The Job Corps and NYC-OS are substitutes for each other. As Table 42 shows, the costs of the Job Corps are considerably higher than those of NYC-OS. This is not necessarily a criticism of the Job Corps, since it is patently wrong to make efficiency judgments solely on the basis of cost comparisons without knowledge of relative program benefits. However, from limited information available, the benefits of the Job Corps and NYC-OS appear to be of similar magnitude.

The Cain study and the Resource Management Corporation study of the Job Corps (studies 1 and 3 in Table 42) are based on the same set of data. Although the assumptions these studies make concerning relative benefits differ somewhat, the differences are not great enough to cause major divergences in the estimated marginal rate of return. In both studies, the rate of return is less than the 5 percent lower bound assumed for the social cost rate of capital.

TABLE 41.—Comparative analysis of cost and benefit estimations of selected studies of the JOBS and CEP programs

Name of Study	Time Period of Study	Locus of Study	Experimental Group	Control Group	Cost/Year		Benefit/Year		Duration of Training in Years	Duration of Benefits in Years	Rate of Return (percent)	Present Value in Dollars	
					Marginal	Average	Marginal	Average				5%	10%
JOBS:													
1. Greenleigh Assoc.	1969-70	10 SMSAs	Program Enrollees	Before-after	3488 [1]		2274 [2]		1 [3]	10 [4]	64.8		2966
				Comparison	3488		2274		1	40	65.2	17045	13401
2. Dept. of Labor	1966-68	Nation-wide	Program Enrollees	Before-after	3239 [1]		1015 [2]		1 [3]	10 [4]	28.9	4380	2725
				Comparison	3239		1015		1	40	31.3	13503	6079
CEP:													
3. Operations Research, Inc.	1967-68	7 central cities	Enrollees placed in jobs	Before-after	3470		2228 [5]		1	10	63.7	13080	9291
				Comparison	3470		2228		1	37	64.2	31255	16504

NOTES TO TABLE 41

1/ Costs are total social costs and include all payments to the firm plus opportunity costs represented by the participants' starting wage and final wage differential. These costs may overstate true social costs since some of the costs inputed by firms may be payments for idle capacity, the use of which does not represent a social cost; that is, in the absence of the JOBS program, the capacity would not have had any alternative use.

2/ Benefit differentials are deflated by the Consumer Price Index as a partial adjustment for changes in labor market conditions between the "before" and "after" measurement periods.

3/ The 1 year-on-the-job training period is an obvious simplification for computational purposes. The Subcommittee on Employment, Manpower, and Poverty, op. cit., April 1970, suggests that the on-the-job training period is about 9 months, p. 169.

4/ The 10-year discount period is an arbitrary period chosen for purposes of standard comparison. The 40-year period represents the average working life remaining to the JOBS enrollee after his on-the-job training is completed.

5/ These are gross weighted wage rate differentials based upon the wage rate experience of minority disadvantaged males, age 18-21 and age 22-44; and minority disadvantaged females, age 18-21 and 22-44.

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TABLE 41 (Sources)

1. Benefit data are from: Greenleigh Associates, Inc., The Job Opportunities in the Business Sector Program: An Evaluation of Impact in Ten Standard Metropolitan Statistical Areas, Washington, D.C., June 1970. Cost data are from: System Development Corporation, Evaluation of the JOBS Program in Nine Cities, Final Report, Technical Memorandum TM-WD-(L)-313/001/00, Falls Church, Virginia, September 1969.

2. Benefit data are from: U.S. Senate, Committee on Labor and Public Welfare, Subcommittee on Employment, Manpower and Poverty, The JOBS Program (Job Opportunities in the Business Sector), Background Information, 91st Congress, 2nd Session, April 1970. Cost data are from: System Development Corporation, op. cit., September 1969.

3. Benefit data are from: Operations Research, Inc., CEP Evaluation Methodology, Phase I Report, Technical Report 617, Draft, Silver Spring, Maryland, 13 July 1970. Cost data are from: Leasco Systems and Research Corporation, Quantitative Analysis of the Concentrated Employment Program, Vol. II, Technical Report MSG-101/69, Silver Spring, Maryland, 13 August 1969.

TABLE 42.—Comparative analysis of cost and benefit estimates of selected studies of the Job Corps and NYC-OS

Name of Study	Time Period of Study	Locus of Study	Experimental Group	Control Group	Cost/Year		Benefit/Year		Duration of Training in Years	Duration of Benefits in Years	Rate of Return (percent)	Present Value in Dollars	
					Marginal	Average	Marginal	Average				5%	10%
JOB CORPS:													
1. Cain	1966-67	Nation-wide Judgmt. Sample	Program Participants	No-shows	3756 3756		193 193		1 1	10 45	Neg 4.4	Neg -310	Neg -1684
2. OEO	1966-68	Nation-wide	Program Participants	Before-after Comparison	3613 3613		774 774		1 1	10 45	16.9 21.4	2251 9661	1039 3655
3. Resource Mgt. Corp.	1965-68	Nation-wide Jdgmt. Sample	Program Participants	No-shows									
a. Males					3756 3756		87 87		1 1	10 46	Neg Neg	Neg Neg	Neg Neg
b. Females					3756 3756		135 135		1 1	10 46	Neg 2.4	Neg -1278	Neg -2203
NYC (O/S):													
4. Borus, et al.	1967	Indiana	Program Participants	No-shows, Eligible Non-Participants	561		172		1 1	10 47	28.1 30.7	731 2411	451 1036

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TABLE 42 (Sources)

1. Glen G. Cain, "Benefit/Cost Analyses for Job Corps," Discussion Paper 9-67, Institute for Research on Poverty, University of Wisconsin, Madison, Wisconsin, 1967.

2. A and R Reports #11, "Job Corps Benefit/Cost Study," Evaluation and Research Branch, Plans and Evaluation Division, Plans and Programs Directorate, Job Corps, Office of Economic Opportunity, Washington, D.C.

3. Benefits are taken from: Resource Management Corporation, Evaluations of the War on Poverty: The Feasibility of Benefit-Cost Analysis for Manpower Programs, RMC Report UR-054, Bethesda, Maryland, March 1969. Costs are taken from: Glen G. Cain, op. cit., 1967.

The OEO study (study 2 in the table) of the Job Corps bases benefits on a before-after comparison. Such a comparison has a built-in upward bias to it, although the magnitude of the bias is not known. If forced to make a judgment, we would judge that the NYC-OS is a more efficient social investment than the Job Corps, since the methodology of Borus et al.(study 4) has had to make fewer compromises with optimal social science methodology. Thus, given the limitations of the analysis, mainly, the possibility that different populations are being served any additional social funds available for human capital investment should be allocated more heavily toward NYC-OS than toward Job Corps.

A SPECIAL CASE: VOCATIONAL EDUCATION AND THE NEGRO

The socially disruptive effects of racial discrimination extend throughout the labor market and result in generally lower earnings and employment of nonwhites, both those who elect a comprehensive high school curriculum and those who study within the vocational-technical curriculum.

Labor market discrimination based on race may be considered as of two kinds. The first can be termed "historical discrimination," attributable to practices and institutions that result in a generally lower level of health, education, and training for the nonwhite population compared to the white population. The second can be termed "current labor market discrimination," the result of discrimination between nonwhites and whites who have equal productivity in the labor market.

The analysis which follows is an analysis of current labor market discrimination. The sample of observations are derived from nonwhite and white high school graduates from the 1959-60 graduating classes in Detroit, Philadelphia, and Baltimore. None of these graduates had any post-secondary or 2-year or 4-year college education at the time they were interviewed, 6 years after their graduation. In addition, the white and nonwhite samples were further standardized on the basis of IQ, father's education, sex, marital status, type of curriculum followed in high school, and condition of the labor market at the time of graduation. To our knowledge, this is the only major study of racial discrimination in the labor market that controls for all the above influences simultaneously and, hence, isolates in its present form the effects of current labor market discrimination on nonwhites. Table 43 shows the results of the analysis of a random sample of white and nonwhite high school graduates in three northern cities.

In the first year after graduation white vocational-academic graduates earn $124 more per month than do nonwhite graduates from that curriculum. Also, the whites are employed 30.63 percentage points more than nonwhite graduates. By the sixth year after high school graduation there is no statistically significant difference in the earnings of white and nonwhite vocational-academic graduates. However, in order to achieve earning equality, nonwhites must be employed 8.44 percentage points more than whites.

TABLE 43.—Effects of racial discrimination on earnings and employment for graduates from selected secondary curricula, three northern cities, 1959-60—1966[a]

Sample groups		Average monthly before tax earnings			Percent of time employed		
		First [b]	Sixth	6-year Average	First	Sixth	6-year Average
Vocational-academic and vocational-technical secondary graduates	I	124[c]**	-6	81**	30.63**	-8.44*	11.96**
		(13)	(19)	(14)	(3.93)	(3.54)	(2.57)
	II	144**	106**	145**	22.11*	2.00	9.74*
		(33)	(35)	(31)	(10.35)	(4.39)	(4.45)
	III	120**	-20	71**	32.91**	-7.56	15.76**
		(14)	(20)	(14)	(3.63)	(4.46)	(3.03)
Comprehensive secondary graduates	I	100**	24	76	23.57**	-6.00*	11.06**
		(12)	(17)	(11)	(3.07)	(2.92)	(2.30)
	II	99**	145**	123**	17.11**	7.02	10.87
		(27)	(32)	(26)	(5.99)	(3.87)	(4.29)
	III	93**	-11	59**	23.95**	-8.69*	11.13**
		(11)	(18)	(11)	(3.59)	(3.72)	(2.70)

Source: Unpublished data from Teh-wei Hu, Mau Lin Lee and Ernst W. Stromsdorfer, A Cost-Effectiveness Analysis of Vocational Education: A Comparison of Vocational and Nonvocational Education in Secondary Schools, Institute for Research on Human Resources, The Pennsylvania State University, University Park, Pennsylvania, March 1969.

NOTES TO TABLE 43

a/ This analysis standardizes for the effects of month and year of high school graduation, labor market at the time of graduation, IQ, post-high school training other than 2-year or 4-year college, education, marital status, sex and father's education. Thus, the differences between whites and Negroes in this analysis are a very close measure of current racial discrimination practices as they existed in three northern cities from 1959-60 through 1966.

b/ First = first year after graduation; Sixth = sixth year after graduation; 6-year average = average experience during the 6-year period after graduation.

c/ This statistic is the partial regression coefficient and its standard error in parentheses. The partial regression coefficient is interpreted as follows: It measures the difference between average earnings or employment of white graduates and Negro graduates. Thus white vocational-technical graduates earned $124, more per month than Negro vocational graduates in the first year after they graduated.

I = males and females combined.
II = males only.
III = females only.
** = significant at a .99 level of significance, two-tail test.
* = significant at a .95 level of significance, two-tail test.

The data show that discrimination as measured by monthly earnings is more serious in an absolute sense for nonwhite male vocational-technical graduates than it is for their nonwhite female counterparts. White male vocational-technical graduates earn $144 more per month than their nonwhite counterparts in the first year after graduation white female vocational-technical graduates earn $120 more per month in the first year after graduation than their nonwhite counterparts.

In the sixth year after graduation white males earn $106 more than their nonwhite male vocational-technical counterparts, but although there is no statistically significant difference between the earnings of the two female ethnic groups, the nonwhite females are better off in that they are earning an average of $20 per month more and working an average 7.56 percent less time than their white counterparts. The nonwhite male vocational-technical graduates, in addition to earning $106 per month less than the white graduates, are shown as working more (2.0 percent).

The picture is slightly different for comprehensive high school graduates. In the first year after graduation, nonwhites earn $100 a month less than whites and whites are employed 23.57 percentage points more. In the sixth year after graduation there is no difference in monthly earnings between the two racial groups, but to achieve this, nonwhites must work 6 percentage points more than their white comprehensive program counterparts. Whereas for nonwhite male vocational-technical graduates the absolute earnings cost of discrimination improved somewhat over the 6-year post-graduation period, for nonwhite male comprehensive graduates the impact of discrimination increased. In the first year nonwhites earned only $99 per month less than their white counterparts; the difference increased to $145 per month in the sixth year after graduation. For nonwhite female comprehensive graduates the earnings situation improved. There was a $93 per month difference in the first year. In the sixth year there was no statistically significant difference in earnings, but this was achieved only because nonwhite female comprehensive graduates worked 8.69 percentage points more in the sixth year than did their white female counterparts.

Thus for a Negro male or other nonwhite male, it is better in the long run to be a vocational-technical graduate than a comprehensive high school graduate. It will cost about $39 a month less in current labor market discrimination. Among nonwhite females, however, the absolute discrimination cost is lower for comprehensive graduates than for vocational-technical graduates.

ANALYSIS BASE: A REITERATION OF STUDY QUALIFICATIONS

Most social programs designed to enhance the quality and quantity of human capital have multiple goals and outputs. The goals can be seen as broadly comprised of four elements: economic efficiency; equity or income distribution; socialization, i.e., the inculcation of socially desirable values and behavior; and pure consumption benefits.

The objectives of the programs analyzed above heavily emphasize the first three of these goals. The consumption benefit of training and education, while not defined as a program output, is simply a residual benefit and is not counted in the analysis. In addition, the above comparative analyses concentrate exclusively on the economic efficiency goal. The equity and socialization goals are not evaluated, although the socialization goal is reflected to some degree in earnings and employment. Thus, while the Job Corps has a poor relative standing in terms of economic efficiency, it may still be desired for its socialization value, e.g., "keeping the kids off the streets." This is just to point out that the efficiency goal is only one of several that need to be weighed in any program evaluation.

The economic benefits in this analysis are all monetary economic benefits based on before-tax earnings. Increases in earnings represent increases in value added to the gross national product. Hence, if GNP is an appropriate index of social well being, before-tax wage increases represent increases in social well-being. However, to the extent that trained workers may displace untrained workers, an overestimate of social benefits occurs since the effect of this displacement is to redistribute income rather than add to income. The income redistribution effects may or may not be socially desirable. In any case, they are not treated in any of the studies cited or in this summary of those studies.

In keeping with this emphasis on social benefits (as distinct from benefits that might accrue to a specific governmental unit, such as the Federal Government costs are calculated to reflect total social resource cost. Thus they include current operating expenses; capital costs; and the opportunity costs, such as foregone wages or out-of-pocket expenses, attributable to an educational or manpower program. When interpolations are made between different years, the Consumer Price Index has been used to appropriately adjust costs or benefits. No growth rate has been assumed in the benefit measures, although the assumption of a 2 percent growth in benefits would not be unreasonable and the use of such a growth rate would not reverse the conclusions and recommendations of this analysis.

Benefits of secondary vocational education are assumed to accrue for between 6 and 10 years —benefit periods which appear to persist in the Hu et al. and Eninger studies, respectively. Thus, for purposes of comparison, the other manpower programs, all of which have much shorter follow-up periods, are evaluated assuming a 10-year period and a remaining working life benefit period. In most cases there is little difference in rates of return estimated by the two different benefit periods, especially when the rate of return tends to be high. The high rate of return practically wipes out the returns in later periods, due to the geometric compounding involved in the calculation.

The interest rates used to discount costs and benefits in this study represent the best estimate of the upper and lower bounds of the social opportunity cost (rate of return) to social investment funds. We would argue more strongly for the 10 percent rate than for the 5 percent rate.

Finally, this analysis assumes that nationwide studies form a better base for policy recommendations than do local or regional case studies. It also assumes that studies using a control group form a more reliable base for benefit measurement than do studies using before-after comparisons of the enrollee group.

DATA—NEEDS, SOURCES, QUALITY

Needs

Nationwide evaluations based on statistically sound random samples and employing the best available control group comparisons need to be performed for the Job Corps, the Out-of-School NYC, JOBS, and WIN. Except as a monitoring exercise or in the event that major funding or institutional changes occur in the MDTA, MDTA evaluation probably should not have a high priority claim for major outlays of funds at this time. Future evaluations should be made, of course, especially if improved methodologies are used.

Our analysis says little about the structure of costs and benefits within occupational specialities in MDTA, secondary, and post-secondary vocational education. A definitive study in this area is required but will be relatively expensive, that is, will cost more than a few hundred thousand dollars, since large sample sizes and field interviewing are required.

The CEP really should be evaluated in terms of its management efficiency, since it is an umbrella organization that embraces a variety of manpower programs such as the MDTA and the NYC.

Further needs are spelled out in the document Federal Evaluation Policy, a recent publication of the Urban Institute. [4/] This report ascribes to the recommendations of the Urban Institute analysis. There is no point in reiterating that document here.

Sources

The sources for the analysis in this study are federally funded evaluations, or evaluations funded by private, nonprofit organizations. They represent the most recent work done in the field, although in most cases the labor market experience of the groups studied dates from the early to the middle 1960s.

[4/] Joseph Wholey, et al., Washington, D.C., June 1970.

Quality

Given the policy prescriptions that are desired, the data in this analysis present quality problems in three major areas. First, the follow-up periods are relatively short. The longest follow-up periods were in the Hu et al. and Eninger studies—6 and 10 years, respectively. The Corazzini study, in contrast, uses entry wage rate comparisons. Second, the control groups used are not always ideal. In general, the before-after comparison is a less accurate way of measuring net benefits than is the use of an appropriate control group. As a result, the cost data are relatively more accurate than the benefit data. Third, the statistical analysis used to estimate net social benefits differs sharply among studies. Some, such as Hu et al., use regression analysis and are able to net out the effect on earnings of such things as IQ and age. Others, for example the Corazzini study, control for no variables or for only one, such as sex. Extensive labor market earnings data gathered over time served as the basis of analysis in some studies, while such things as starting wage rates with no follow-up period serve as the base for benefit estimations in other studies.

VIII. FEDERAL FUNDING OF VOCATIONAL EDUCATION: ITS ROLE AND IMPACT

INTRODUCTION

This section presents the results of an analysis of the Federal grant-in-aid program that attempted to answer the specific questions listed below:

a. Do the vocational education programs in school districts receiving a larger than average share of Federal money grow more rapidly, or are Federal funds substituted for State-local funds?

b. How are additional Federal funds split between vocational education and other education programs?

c. How is "need" for funds defined and measured in relation to resources available?

d. How are Federal "capital" (or construction) funds allocated among districts—do funds go to districts that can raise money or to those that cannot?

e. How well does "pump priming" work, i.e., full Federal financing to start programs that will be funded by non-Federal monies at a later date?

f. Does Federal funding tend to redistribute resources, i.e., where do the Federal monies for education (specifically, vocational education) come from and where geographically are they spent?

g. What are the rates of return to a local area for investments in various types of education; i.e., what percentage of persons residing in the area versus persons employed in the area, were enrolled in each type of curriculum?

h How much is spent on vocational education by the Federal, State, and local governments?

The analysis discussed subsequently provides tentative answers to a, c, f, and h; b, d, e, and g could not be researched in the short time available and are still under consideration. Additionally, it was discovered that no complete U.S. school district data are readily available; hence the analyses were performed using State-level data.

BACKGROUND

Grants-in-aid to States, in support of vocational education programs at the State and local levels, were among the first forms of Federal aid to education (George-Barden through Smith-Hughes Acts, 1918-1948). In the 1950s and 1960s the size of Federal grants to States increased considerably and the occupational program areas to be funded were broadened in scope and purpose. In 1958, in 1963, and again in 1968, Congress significantly increased the level and types of funding for vocational education programs. During the 5-year period FY 1964 through FY 1969 Federal funding of these programs grew from $55 million to $196.5 million, a nearly fourfold increase. (These figures do not include Federal expenditures on facilities construction, i.e., capital funds.) At the same time rather dramatic changes occurred in the relative amounts of Federal monies being allocated to specific program categories, or occupational components.

The eight major occupational components are: agriculture, trade and industry, technical, office, health, distributive education, home economics (gainful) and "other". As shown in Table 44, the absolute (dollar) level of Federal funding was increased substantially for all of these components except home economics (gainful). However, there were significant changes in the proportion of total Federal funds going to each. For example, although the level of Federal funding to agricultural programs nearly doubled between 1964 and 1969, from $13.7 to $26 million, the percent of Federal funds devoted to such programs declined by nearly half, from 24.9 percent to 13.2 percent, over the same period. One is inclined to argue that given the decreasing relative importance of agriculture in the U.S. economy, together with the increasing importance of manufacturing and, particularly, the service sector, this relative shift in Federal spending for vocational education is appropirate.

The occupational components exhibiting the greatest increases in absolute Federal funding over the 1964-1969 period tended to show the greatest relative increases as well. Total Federal expenditures on trade and industrial

TABLE 44.—Federal funding to vocational education, by program category, FY 1964 through FY 1969

Categories	1964	1965	1966	1967	1968	1969
	Millions of dollars spent in each category					
Agriculture	13.7	20.4	25.6	27.0	26.1	26.0
Trade & industrial	11.4	34.0	50.2	61.7	59.9	62.4
Technical	13.6	21.0	19.8	23.8	21.7	23.7
Office	-	12.1	23.4	29.1	31.0	32.2
Health	4.8	5.3	6.1	8.5	11.5	13.1
Distributive	2.6	4.6	7.0	8.3	9.3	10.2
Other	0.1	6.9	7.3	13.2	17.4	23.2
Home econ (gainful)	8.9	9.8	3.5	4.6	5.3	5.7
Total	55.1	114.1	142.9	176.2	182.2	196.5
	Percent of dollars spent in each category					
Agriculture	24.9	18.0	17.9	15.3	14.3	13.2
Trade & industrial	20.8	29.8	35.1	35.1	32.9	31.8
Technical	24.7	18.4	13.9	13.5	11.9	12.0
Office	-	10.6	16.4	16.5	17.0	16.4
Health	8.7	4.6	4.3	4.8	6.3	6.7
Distributive	4.7	4.0	4.9	4.7	5.1	5.2
Other	-	6.0	5.1	7.5	9.6	11.8
Home econ (gainful)	16.2	8.6	2.4	2.6	2.9	2.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

programs increased five times, from $11.4 million (20.8 percent of the total) to $62.4 million (31.8 percent) over the period. By comparison, although Federal funding of the technical component increased by nearly 100 percent, from $13.6 million to $23.7 million, the relative portion allocated to this component declined from 24.7 percent of total Federal vocational education funding in 1964 to only 12 percent in 1969.

Two components are of particular interest, namely, "office" and "other." In 1964 no Federal funds were allocated to the former and only $100,000 to the latter category. In 1969 the two together commanded $55.4 million, or 28.2 percent of the total Federal support to vocational education. Two other program categories are also of specific interest, but because they show either insignificant growth in relative terms (distributive) or a substantial decline (health). The absolute level of Federal funding to distributive vocational education increased from $2.6 million in 1964 to $10.2 million in 1969; however, these figures, respectively, represent 4.7 percent and 5.2 percent of the total Federal funding. Such a nominal increase in the relative priority of distributive vocational education, at least at the Federal level, does not appear to be in consonance with the growth in the importance of this sector of the U.S. economy and the corresponding demand for skilled labor in this area. Even more puzzling is the Federal funding of vocational education programs in the health and allied fields. Again, although Federal expenditures in this program area increased from $4.8 million to $13.1 million between 1964 and 1969, the proportion of the total Federal funding devoted to it actually declined, from 8.7 percent to 6.7 percent over the same period. That Federal funding of the health occupational programs should actually decline in relative importance over this 5-year period can hardly be reconciled with the large and growing shortage of medical and paramedical personnel in all of the health and dental fields.

Tables 45, 46, and 47 give breakdowns of State and local funding of vocational education, by program category. Comparing the proportionate contributions by the three levels of government during fiscal 1969, the Federal expenditure of $196.5 million represents 17.7 percent of the total public expenditure on vocational education; State and local expenditures, respectively, represent 34.4 percent and 47.9 percent of the total.[1/] Given these expenditures, and the objectives of the Federal funding programs, what can be said with respect to the impact of the Federal commitment to vocational education?

1/ USOE, "Summary Data on Vocational Education for Fiscal Year 1969," Washington, D.C., April 1970, p.6.

TABLE 45.—State funding to vocational education

Occupational Category	1964		1967		1968		1969	
	$ spent (millions)	Percent of $ spent	$ spent (millions)	Percent of $ spent	$ spent (millions)	Percent of $ spent	$ spent (millions)	Percent of $ spent
Agriculture . . .	30.8	23.8	33.1	15.2	35.7	12.7	38.9	11.7
Trades and industry . . .	39.4	30.1	68.9	31.7	85.2	30.4	107.2	32.4
Technical . . .	8.4	6.4	24.1	11.1	30.7	10.9	34.3	10.4
Office.	—	—	40.1	18.6	59.3	21.1	71.5	21.6
Health	3.4	2.6	11.8	5.4	15.4	5.5	19.7	6.0
Distribution . . .	6.0	4.6	18.7	8.6	18.2	6.5	21.6	6.5
Other	5.6	4.3	16.4	7.6	31.5	11.2	32.6	9.8
Home econ (gainful) . . .	36.8	28.2	3.7	1.7	4.8	1.7	5.4	1.6
Total. . .	130.4	100.0	216.8	100.0	280.8	100.0	331.2	100.0

TABLE 46.—State funding to vocational education, 1965-1966

Occupational Category	1965		1966	
	$ spent (millions)	Percent of $ spent	$ spent (millions)	Percent of $ spent
Agriculture . . .	66.4	16.9	63.1	16.7
Trades and industry . . .	110.9	28.3	135.3	35.7
Technical . . .	41.6	10.6	39.5	10.4
Office.	41.5	10.5	68.2	18.0
Health	14.3	3.6	15.7	4.1
Distribution . . .	17.0	4.3	20.8	5.5
Other	12.6	3.2	25.1	6.6
Home econ (gainful) . . .	88.6 (all)	22.6	11.3	3.0
Total	392.9	100.0	379.0	100.0

TABLE 47.—Local funding to vocational education

Occupational Category	1964		1967		1968		1969	
	$ spent (millions)	Percent of $ spent	$ spent (millions)	Percent of $ spent	$ spent (millions)	Percent of $ spent	$ spent (millions)	Percent of $ spent
Agriculture . . .	32.9	21.5	43.3	14.8	48.0	13.2	52.9	11.4
Trades and industry . . .	52.2	34.2	104.9	35.9	123.4	34.2	148.8	32.2
Technical . . .	12.8	8.4	27.6	9.4	35.4	9.8	43.2	9.4
Office.	—	—	63.6	21.7	85.2	23.7	113.1	24.4
Health	4.3	2.8	13.0	4.4	19.7	5.5	28.1	6.1
Distribution. . .	6.3	4.1	20.4	7.0	20.8	5.8	26.3	5.6
Other	—	—	14.2	4.9	20.4	5.7	41.4	8.9
Home econ (gainful) . . .	44.2	29.0	5.7	1.9	7.5	2.1	9.1	2.0
Total. . .	152.7	100.0	292.7	100.0	360.4	100.0	462.9	100.0

SPECIFICATION OF OBJECTIVE-STIMULATE PROGRAM GROWTH

Vocational education grants come under the generic title of "conditional specific grants,"[2] insofar as the Federal Government defines the activity to be aided and tries to guide the performance of the recipient government. The rationale for such grants is that certain specific functions, in this case vocational education and training, are in some sense being "under-performed" at the State and local levels, and the Federal grant is meant to stimulate activity.[3] It is quite clear that one objective of Federal vocational education funding has been to stimulate expenditures on occupational programs at the State and local levels.

The Federal grants may also be seen as block grants designed to support secondary or post-secondary education in general. In this case, Federal expenditures need not generate extra expenditures from the local school district(s) or the State as a whole; the objective is, rather, to relieve the burden of such expenditures at the State and local levels.

In point of fact, vocational education grants-in-aid have served, to a degree, both objectives at once. That is to say, for a student population of a given size, Federal grants designed to increase expenditures for vocational education might succeed in changing the relative emphasis in occupational training within a school district—as well as the per pupil expenditures in programs within that district—without increasing the total per pupil expenditures on vocational education within the same district. Thus, in order to evaluate the effectiveness of Federal vocational education grants-in-aid it is necessary to stipulate their objective(s) quite clearly. If we consider them "conditional specific" in nature--i.e., grants to stimulate vocational education activities--then the States or districts receiving relatively more Federal funds i.e., average aid per pupil, (a) should be spending relatively more on vocational education; (b) ought to experience a relatively more rapid growth in the percent of pupils enrolled in such programs, ceteris paribus, and (c) should exhibit relatively higher rates of per pupil expenditures, ceteris paribus.

The evidence is sketchy, at best, that any one of these three responses has been elicited by the grant-in-aid program. Davie and Patterson, in a study of vocational education intergovernmental fiscal relations, attempted to test the first of the three by regressing State and local expenditures (totals, by State) against Federal expenditures (by State) utilizing time series data for the period 1947-1964.[4] Statistical estimation problems considerably weaken

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[2] J. Maxwell, Governmental Grants in Aid, Brookings Institution, p. 67.

[3] In effect, the "preferences" of the Federal Government with respect to expenditures in this area are substituted for State and/or local preferences. (Ibid.)

[4] B.F. Davie and P.D. Patterson, Jr., Vocational Education Intergovernmental Fiscal Relations in the Postwar Period, Georgetown University, Washington, D.C., December 1966, pp. 20-30.

the results, which (tentatively) indicate a positive relationship between the level of State and local expenditures and the level of Federal expenditures. This analysis suffers from at least two severe defects: (a) it does not control for State-to-State variations in such things as income and tax base and (b) the analysis is carried out at the State level—hence the effect of Federal grants-in-aid on the level or rate of change of State and local expenditures at the school district level cannot be determined. In a cross-sectional analysis that simply tested the hypothesis that higher levels of Federal expenditures will be associated with higher levels of State and local expenditures for vocational education, a positive and statistically significant relationship existed between State and local expenditures and Federal expenditure levels. The estimation is weak in that such important variables as income were not included in the regression. Hence the causal link that appears to exist between Federal expenditures and State and local expenditures might acutally be between State income levels and State and local expenditures.

The same study attempts to address the issue of growth of occupational program offerings by investigating the possible stimulative effects of Federal aid to technical education under the George-Barden Act. Such aid was begun in 1958. Davie and Patterson analyzed the period 1958-1963. The proxy for occupational program growth is a matching expenditure ratio that indicates the extent to which State and local expenditures exceed Federal expenditures. A ratio of 1 implies simple one-for-one matching, which is necessary for acceptance of the Federal monies. The data indicate an increase from 7 to 11 (over the period 1959-1964) in the number of States in which State and local expenditures exceeded Federal funding in a ratio of at least 1.45 to 1. This statistic, along with measures of the extent to which States made any use of newly available Federal funds for technical education, led Davie and Patterson to conclude that "federal aid has had great stimulative effect on program expenditures in some states, has supported or advanced already existing program expenditures in some other states and has had little or no effect on program expenditures in still other states."[5/] For the reasons mentioned, we cannot reach the same strong conclusions on the basis of this evidence.

SPECIFICATION OF OBJECTIVE—REDISTRIBUTE RESOURCES IN RESPONSE TO "NEED"

Vocational and technical grants-in-aid have apparently been designed with yet another objective in mind, beyond that of simply stimulating expenditures

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5/ Ibid., p. 45.

in the particular functional area. Specifically, the grant-in-aid formula for both the 1963 act and the 1968 amendments contains specific redistributive features. The proportion of total Federal monies granted each State is intended to be positively related to the ratio of training-age youth to total population (in each State) and negatively related to the average personal income level of the State. Here the objective is clear. Vocational and technical education is seen from the Federal level as a "social good" that is not adequately provided for in the lower income areas of the country. Presumably, Federal grants-in-aid to such areas will redistribute resources from high income areas to lower income areas and stimulate local program development.

There are, however, some serious problems in the Federal approach, with respect to both the attempt to stimulate expenditures and the attempt to direct relatively more funds to lower income States. The Federal Government does some monitoring of the type of training undertaken by the States, by requesting State plans, but such monitoring is minimal. The State plans are developed from surveys of local area "training needs"; hence we have Federal support of locally determined educational training programs, the direct benefits of which are designed to be local in nature. That is to say, training "needs" are determined by local labor market skill surveys, and placement efforts for graduates are directed toward local employers. If the programs are successful, graduates are placed "close to home." This is unlike the ordinary secondary school or junior college situation, wherein Federal subsidization occurs, in part, because of local "under-investment" and the geographic "spillover" of benefits.

In the aggregate, this type of Federal support may be rational in that national increases in the overall productivity of the work force may occur. However, the geographic distribution of benefits, taken together with the effort to increase vocational education expenditures relatively more in low income areas, raises a difficult issue with regard to local determination of such training programs. Should, for example, the Federal Government subsidize agricultural programs in southern and rural areas, when a good part of the income disparity between these and other areas of the country is due to the lack of well-paying jobs in these very same areas? If, on the other hand, the Federal Government should try to increase labor mobility and productivity by encouraging training for jobs outside the low-income area, it can do so only by abandoning the concept of local labor market surveys and local placement activity in the determination of training "needs."

ASSESSMENT OF THE ACHIEVEMENT OF THE TWO OBJECTIVES

What follows is a brief empirical investigation of the two main objectives of Federal grants-in-aid for vocational education. The two primary questions are (a) do Federal grants have an effect on State and local expenditures, and (b) does the Federal Government succeed in allocating its funds in a greater

proportion to lower income areas? The analysis is carried out with States as the basic unit of observation. It is preferable, of course, to focus on the school districts rather than the States; but data by school district were not readily available.

Regressions were run, using cross-sectional data for the 1965 fiscal year.[6/] The basic question to be resolved is whether differences in the level of Federal expenditures account for differences in the level of State and local expenditures on vocational education, taking into account such factors as family income levels and State and local tax efforts.

Two sets of regressions were run. In the first, per capita State and local expenditures comprised the dependent variable; the independent (explanatory) variables were per capita Federal expenditures, per capita income, and such items as per capita value added and State tax effort. In separate calculations, Federal per capita expenditures served as the dependent variable, with per capita income and tax effort the independent variables. In no regressions using per capita expenditures for vocational and technical education were statistically significant results obtained. In a re-run of the Davie equation

$$S\&L/P = \alpha + \beta\, Fed/P + \mu \qquad (1)$$

where

S&L/P = State and local expenditures per capita

Fed/P = Federal expenditures per capita

no statistically significant relationship could be measured. The results were as follows (t value in parentheses under each partial regression coefficient):

$$S\&L/P = 3.4 + \underset{(.61)}{.31}\ Fed/P. \qquad (2)$$

$$\bar{R}^2 = .01$$

In the other runs, similarly inconclusive results were obtained:

$$S\&L/P = 4.41 + \underset{(.02)}{.0008}\ Y/P; \qquad (3)$$

$$\bar{R}^2 = .02$$

6/ Obviously, it is preferable to pool cross-section and time-series data, but data incompatibilities and limitations on computer resources made this impossible.

$$S\&L/P = \underset{}{4.17} + \underset{(.14)}{.0004\ Y/P} + \underset{(.81)}{.0004\ F/P} \qquad (4)$$

$$\bar{R}^2 = .02$$

where

Y/P = income per capita.

In a second set of regressions expenditures per enrollee rather than per capita were used for both the Federal and the State and local levels. In place of per capita income, two measures were introduced: median family income, and the percent of the population earning less than $3,000 in 1960. As in the first set of estimations, income and Federal expenditures for vocational and technical education, taken both separately and together, were used to explain variations in the level of State and local expenditures. Median family income alone could not account for the variations in State and local expenditures, nor could the percent of families with incomes less than $3,000 in 1960. Expenditures did appear to be positively related to median income levels and negatively related to the percentage of people below the $3,000 level. However, neither result was statistically significant. When Federal expenditures were introduced as an independent variable along with income, the results were statistically significant:

$$S\&L/E = \underset{}{10.6} + \underset{(7.9)}{1.58\ F/E} + \underset{(2.4)}{.007\ MFI}, \qquad (5)$$

$$\bar{R}^2 = .61$$

$$S\&L/E = \underset{}{50} + \underset{(7.7)}{1.56\ F/E} - \underset{(2.2)}{.76\ P_{ov}} \qquad (6)$$

$$\bar{R}^2 = .60$$

where

S&L/E = State and local expenditures per enrollee

F/E = Federal expenditures per enrollee

MFI = median family income

P_{ov} = percent of families with annual income less than $3,000.

These results suggest that both income levels and the extent of Federal aid have an impact on the overall level of State and local spending for vocational and technical education. The level of State and local expenditure seems to correlate with the median family income level in the State when the level of the corresponding Federal expenditure is held constant. Thus, relatively more affluent States will add more of their own resources to vocational education than will relatively poorer States, for a given level of Federal expenditure. However, holding the level of family income in the State constant, the higher the level of Federal expenditure the greater the level of State and local expenditure.

The estimates represented by Equations (5) and (6) are incomplete, in that they take no account of State and local tax effort on the supply side and industrial composition on the demand side. These two elements must be considered to draw more definitive conclusions, and in Equations (7) and (8) the first, State and local tax effort (a measure of the extent to which States attempt to supply their own social services), is introduced:

$$S\&L/E = \underset{}{9.2} + \underset{(7.7)}{1.57}\, F/E + \underset{(2.3)}{.008}\, MFI - \underset{(.08)}{.01}T \qquad (7)$$

$$\bar{R}^2 = .60$$

$$S\&L/E = \underset{}{50} + \underset{(7.5)}{1.57}\, F/E + \underset{(2.1)}{.77}\, P_{ov} - \underset{(.08)}{.01}T \qquad (8)$$

$$\bar{R}^2 = .60$$

where

MFI = median family income

F/E = Federal aid per enrollee

T = tax effort-index based on ACIR representative tax system

P_{ov} = percent of families with annual income less than $3,000.

These estimations, incorporating the tax variable, do not explain any more of the overall variation in State and local spending than the earlier regressions. Moreover, the tax variable is not even statistically significant.

To complete the regression test series a measure of demand factors is introduced that may account for increased State and local spending on vocational education. Specifically, value added by the manufacturing sector is introduced as a proxy variable for the demand for nonagricultural vocational and technical education.

$$S\&L/E = \underset{}{49} - \underset{(2.09)}{.75\ P_{ov}} + \underset{(7.47)}{1.57\ F/E} - \underset{(.04)}{.01T} + \underset{(.54)}{.00V} \qquad (9)$$

$$\bar{R}^2 = .59$$

Once again, only income levels and Federal expenditures appear to have any impact on State and local expenditures.

Presumably, Federal expenditures are related to income levels, with larger amounts going to lower income States, ceteris paribus. A test of this hypothesis was inconclusive. When Federal expenditures per enrollee was made the independent variable, it appeared that such expenditures were lower in lower income states making relatively less tax effort. However, the results were not statistically significant, suggesting that a different model is necessary. Several different structural forms were tried with the available data, but the results were no better. In an effort to improve the results obtained in Equations (1)-(9) several different structural forms were also employed, but, again, no better results were obtained. It is clear that any valid statistical investigation of the important issues raised in this section would require data from the school district level, and these data were simply not available. Hence we are left to speculate about possible problems in the funding of vocational education without the benefit of good statistical results.

If the results in Equations (1)-(9) represent more than random errors of bureaucracy, the analysis indicates that some of the fiscal objectives of the Federal grant-in-aid program are being met reasonably well. Federal monies do generate increases in the level of State and local spending. However, it is not at all clear that the funding program objectives are being met in terms of:

(a) Channeling more Federal funds to the lower income areas[7/]

(b) Increasing labor force mobility

(c) Training large numbers of persons for higher-paying jobs.

Furthermore, as is the case in all such programs, the real question of program effectiveness revolves around the issue of opportunity costs. Is there, in fact, a better use to which the scarce resources currently being devoted to vocational and technical training can be put.

7/ It is true that by changing the formula for distributing Federal monies more redistribution could be achieved. Davie and Patterson demonstrated several ways of accomplishing this objective (op. cit., p. 70). There is the question of whether such changes in the Federal program's distribution would be well advised, given the findings discussed herein.

THE SIZE OF FEDERAL, STATE, AND LOCAL FUNDING OF VOCATIONAL EDUCATIONAL PROGRAMS

Table 48 arrays the funding contributions of each level of government to each type of vocational education. While total State and local expenditures have risen consistently over the full period, total Federal expenditures have remained relatively constant in the 1967-69 period. A somewhat similar pattern prevails when work-study program expenditures and construction costs are removed from the numbers.

TABLE 48.—Vocational education expenditures by Federal, State, and local government

Fiscal year	Total secondary expenditures, ($000)*			Total postsecondary expenditures, ($000)*			Total adult expenditures, ($000)*			Special needs* 1963 act funds only			Total expenditures, all levels, ($000)**			Total expenditures excluding construction and work-study, ($000)		
	Federal	State	Local	Federal	State	Local	Federal	State	Local	Federal	State	Local	Federal	State	Local	Federal	State	Local
[illegible]	[illegible]	[illegible]	[illegible]	52,823	88,633	111,370	10,915	29,730	31,364	9,884	11,905	14,059	254,676	467,173	646,907	203,766	396,795	551,560
[illegible]	[illegible]	[illegible]	[illegible]	42,093	71,637	71,130	10,855	25,082	21,149	6,167	8,514	9,951	262,384	400,362	530,117	191,759	343,674	438,274
[illegible]	[illegible]	[illegible]	[illegible]	42,261	54,797	60,755	10,426	16,653	18,277	3,559	8,025	8,951	260,321	304,711	439,102	183,828	261,632	351,547
[illegible]	[illegible]	[illegible]	[illegible]	26,381	28,831	33,007	8,101	9,984	15,838	1,853	1,157	2,040	233,794	216,583	349,518	151,590	466,793	
[illegible]	[illegible]	[illegible]	[illegible]	13,445	19,946	20,506	6,131	7,290	5,241	346	105	354	156,936	186,735	260,975	108,046	383,948	

[illegible]. Vocational and Technical Education Annual Report, Fiscal years 1965 - 1969.

* Federal funding from Vocational Education Act of 1963 plus State and local matching funds.

** Includes Federal funding from Vocational Education Act of 1963, Smith-Hughes and George-Barden Acts, plus State and local matching funds.